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Francoise Elvina Baylis

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THE ETHICS OF **EX UTERO** RESEARCH ON SPARE 'IVF' HUMAN EMBRYOS

by

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ABSTRACT

As the debate on the ethics of *ex utero* research on spare *in vitro* ('IVF') human embryos has evolved, the focus has been primarily on the moral status of the developing human and the potential societal consequences of continued embryological research. For this reason, at the outset, I critically review the relevant literature on personhood and humanhood, and also canvass the many consequentialist arguments both for and against embryological research. In the first chapter, I conclude that the controversy surrounding embryological research cannot be resolved *a priori* on the basis of evaluative and stipulative definitions. In the second chapter, I conclude that although the potential harms of embryological research are significant, they do not outweigh the potential benefits.

Next, existing proposals for limited embryological research are critically examined, with particular attention given to those arguments that attribute moral relevance to a specific developmental feature. In turn, the problems with the various proposals for limiting embryological research to early cleavage, the beginning of implantation, the completion of implantation, the formation of the primitive streak, etc., are systematically exposed.

Then, in the final chapters, the assumption that human embryos are a homogeneous class is explicitly rejected. A

distinction is drawn between: 1) 'IVF' human embryos that, by virtue of their specific constitution and given available medical technology have the potential for continued human growth and development **(viable 'IVF' human embryos)**; and 2) 'IVF' human embryos that do not have this potential and whose death is imminent and unavoidable **(non-viable 'IVF' human embryos)**. On this basis, a distinction between morally acceptable and unacceptable embryological research is then argued for according to which non-viable 'IVF' human embryos morally may be targeted for research provided that: 1) the research is aimed at legitimate scientific, medical, or diagnostic objective(s); 2) the scientific validity of the research is assured; 3) the anticipated benefits are proportionate to the anticipated harms; and 4) the gamete donors (and, as necessary, the prospective social parents) voluntarily consent to the specific aims of the proposed research. Finally, the limitations as well as the merits of the proposed alternative approach to embryological research are briefly considered.

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The idea of allowing science to interfere with our intimate personal impulses is undoubtedly repugnant. But the interference involved would be much less than that which has been tolerated for ages on the part of religion. Science is new in the world, and has not yet that authority due to tradition and early influence that religion has over most of us, but it is perfectly capable of acquiring the same authority and of being submitted to with the same degree of acquiescence that has characterized men's attitude toward religious precepts. The welfare of posterity is, it is true, a motive by no means sufficient to control the average man in his passionate moments, but if it became a part of recognized positive morality, with the sanction not only of praise and blame but of economic rewards and penalties, it would soon come to be accepted as a consideration which no well-conducted person could afford to ignore. Religion has existed since before the dawn of history, while science has existed for at most four centuries; but when science has become old and venerable, it will control our lives as much as religion has ever done. I foresee the time when all who care for the freedom of the human spirit will have to rebel against a scientific tyranny. Nevertheless, if there is to be a tyranny, it is better that it should be scientific.

Bertrand Russell
Marriage and Morals

INTRODUCTION

The Problem

It is widely acknowledged, and often lamented, that truly innovative scientific and technological advances in medicine frequently usher in troublesome moral questions. With In Vitro Fertilization and Embryo Transfer (IVF-ET) -- a technology by means of which children may be conceived outside of the human body -- the most serious of these questions concern the use and disposal of spare 'IVF' human embryos.[1] These are human embryos created in vitro for treatment purposes that, for one reason or another, are not transferred. The focus of my dissertation is on the possible use of such embryos for research purposes. Prior to addressing this specific issue, however, it is imperative that one first understand why there are spare 'IVF' human embryos, in order to appreciate fully the complexity of the dilemma.

At present, in most IVF-ET clinics, the first step in the therapeutic process is the medical induction of ovulation. Fertility drugs (ovarian stimulants) are administered to the women seeking treatment in order to promote the maturation of several oocytes per ovulatory cycle.[2] The next step is oocyte collection; a few hours prior to ovulation, the mature oocytes are recovered by

surgical laparoscopy or they are aspirated with the aid of transvaginal ultrasound. Then, after a one to six hour delay, the oocytes collected are inseminated using fresh, or previously frozen, human sperm. In part, this time is required for sperm capacitation,[3] but it is also necessary to allow immature oocytes to complete their maturation.[4] This is followed by another delay of approximately sixteen hours before the oocytes can be checked for fertilization[5] and screened for morphological abnormalities (for example, three pronuclei or abnormal cleavage). The final step is embryo transfer. This is routinely done on day 2, and at this time as many as three embryos (and possibly more depending upon the clinic) may be returned to a woman's uterus.

The reason for transferring more than one embryo per cycle is to increase the chance of pregnancy. The reason for limiting the number of embryos transferred is to avoid the increased short-term and long-term risks -- both for the mother and for the prospective child -- commonly associated with multiple pregnancies. These risks include: premature labour and delivery; obstetric complications; serious postpartum hemorrhage; perinatal mortality and morbidity (physical and mental); as well as infant mortality.[6]

Recent data indicate that as the number of 'IVF' human embryos transferred increases -- up to a maximum of three -- the pregnancy rate also increases. When more than three

embryos are transferred, however, the pregnancy rate does not increase further.[7] In addition, one extensive study on mortality rates after multiple gestations indicates that there is a marked increase in the percentages of perinatal and infant deaths between triplets, on the one hand, and quadruplets and quintuplets, on the other.[8] These findings suggest that a maximum pregnancy rate and an acceptable multiple pregnancy rate could be achieved by transferring only three embryos per cycle.

This introduces the problem of what to do with those 'IVF' human embryos that are not transferred. Should these spare embryos simply be discarded? If they are not to be discarded, should they be frozen, either for later use in an unstimulated cycle or for donation to an infertile couple? Alternatively, should these embryos be used for research purposes and then be discarded or transferred?

In response to these sorts of questions, Ian Kennedy argues that "the creation of spare embryos should not be facilitated in the first place."[9] He recommends that women not be superovulated and that only one oocyte be collected, inseminated, and transferred per cycle. The practitioners of IVF-ET therapy note, however, that this strategy is impractical given that fifteen per cent of the oocytes exposed to human sperm do not fertilize[10] and given that "fewer than 20 per cent of the replaced embryos implant."[11] Moreover, the proposed strategy is not economical given the cost of IVF-ET therapy.[12] In addition to these costs,

there are the emotional and physical costs borne by the couples, in particular the women.

A less radical proposal for eliminating the problem of spare 'IVF' human embryos suggests that women continue to be hyperstimulated and to have as many oocytes as possible collected, but that the number of oocytes inseminated be limited to three (which is a reasonable number for transfer). In this way, one might avoid the creation of spare 'IVF' human embryos, but still have some of the benefits associated with multiple embryo transfers.

Generally, this proposal is also rejected by the proponents of IVF-ET therapy. The success rate of this therapeutic modality is quite low.[13] It is argued, therefore, from a purely pragmatic perspective, that reducing the number of oocytes inseminated would only further reduce this limited success. On this point Edwards notes that:

> Spare embryos would be avoided by limiting the number of oocytes removed from the ovary, or the number inseminated, but these actions could reduce the chance of establishing pregnancy. There is a mixed population of follicles following ovarian stimulation, and it is essential to aspirate them all in order to ensure that the ripest oocytes are collected. Attempts must then be made to fertilize all the oocytes aspirated, because there have been examples where only one or perhaps two oocytes, were fertilized even though four or more were aspirated. 14

Edwards insists that the collection and insemination of all available oocytes is absolutely necessary in order to ensure that the maximum number of 'IVF' human embryos is available for transfer.

Another equally important reason for creating as many 'IVF' human embryos as possible is to ensure embryo quality. If there are more 'IVF' human embryos available for transfer than can possibly be transferred, then abnormal-looking 'IVF' human embryos, or 'IVF' human embryos with slow cleavage rates, can be excluded from transfer without reducing the total number of embryos for transfer.

A third reason for producing as many 'IVF' human embryos per cycle as possible is to reduce the need for repeated ovarian hyperstimulations and multiple egg collections. The excess 'IVF' human embryos from one treatment cycle can be frozen for later use in an unstimulated (and presumably more receptive) cycle. In sum, according to the proponents of IVF-ET therapy, the collection and insemination of all available oocytes is an important precautionary measure designed to increase the chance of pregnancy.

Those who object to the creation of spare 'IVF' human embryos on moral grounds, however, are not easily swayed by these pragmatic considerations. In particular, a reduced success rate for IVF-ET therapy is a price that they are willing to pay in order to avoid a course of action they find morally objectionable, viz. the creation of spare 'IVF' human embryos.

The fact is, however, that with in vitro fertilization the creation of spare embryos simply cannot be avoided.

Even if one refrained from collecting, inseminating, and transferring more than one oocyte per cycle, there could still be spare 'IVF' human embryos because not all spare embryos are supernumerary embryos. Sometimes 'IVF' human embryos are excluded from transfer and become 'spare', not because there are more embryos created than are needed, but because the embryos created are abnormal. On average, thirty per cent of all of the oocytes fertilized in vitro produce abnormal embryos.[15] For both ethical and pragmatic reasons, when these embryos are identified they are excluded from transfer (and freezing); hence they are 'spare'. To be sure, one could insist that regardless of number or quality all 'IVF' human embryos created should be transferred. In this way, the problem of spare embryos would be avoided. But clearly this option would be ethically unacceptable.

Thus, spare 'IVF' human embryos appear to be an inevitable by-product of IVF-ET therapy. Limiting the number of oocytes collected and inseminated per cycle will reduce the number of spare 'IVF' human embryos, but will not eliminate them. Consequently, the difficult questions concerning the moral acceptability of ex utero research on spare 'IVF' human embryos cannot be side-stepped in the way Kennedy and others suggest. The only sure way to avoid the creation of spare 'IVF' human embryos would be to prohibit in vitro fertilization; something that few are willing to advocate.

A notable exception is the Roman Catholic Church. It explicitly rejects IVF-ET therapy on the grounds that it "breaks the proper nexus between coitus, the expression of marital love, and the conception of the child":[16]

> Such fertilization is neither in fact achieved nor positively willed as the expression and fruit of a specific act of the conjugal union. In homologous IVF and ET, therefore, even if it is considered in the context of 'de facto' existing sexual relations, the generation of the human person is objectively deprived of its proper perfection: namely, that of being the result and fruit of a conjugal act in which the spouses can become 'cooperators with God for giving life to a new person' (italics removed). 17

Granted, however, that the therapeutic use of <u>in vitro</u> fertilization is increasing and that, as a consequence of this, spare 'IVF' human embryos will continue to exist, the critical question is: what should be done with the embryos that are "excess to need"? Should they be discarded, frozen, or used for research purposes?

Each of these options raises important ethical issues. However, only those issues that concern the moral acceptability of <u>ex utero</u> research on spare 'IVF' human embryos are considered in the dissertation.[18] Issues arising from embryological research that include as an integral component the transfer of 'IVF' human embryos to a uterine environment for gestation and delivery are left unexamined. The relevant science is not sufficiently well developed to permit anything other than an extremely speculative discussion of what might be feasible and morally acceptable in this context. Similarly, issues that specifically concern the experimental use of 'IVF' human

embryos expressly created for research purposes, 'IVF' human embryos that exist as a by-product of research on the interaction of ova and sperm, or in vivo human embryos obtained by means of embryo flushing, are not discussed. This is because research on these embryos raises a number of ethical issues that are tangential to the central question concerning the ethics of 'IVF' human embryo research.

The Framework

At the heart of the debate on the ethics of ex utero research on spare 'IVF' human embryos are fundamental questions concerning how we ought to treat nascent human life. As the debate has evolved, however, too often these questions have been side-stepped. The focus has been on the debate regarding the moral status of the 'IVF' human embryo, on the potential consequences of continued embryological research, and not on the esteem in which we hold the developing human.

In the first chapter, the question of moral status is carefully examined. Arguments that claim to show unequivocally that the 'IVF' human embryo either is, or is not, a being with full moral standing are briefly described and critically assessed. In this regard, it should be noted that in Chapter One, and elsewhere throughout the dissertation, some arguments are rejected because they are invalid. Other arguments, though valid, are rejected because they entail consequences commonly found to be

unacceptable. This approach is legitimate because the objectives in applied ethics are both to verify that the conclusions follow logically from the premises enunciated and also to ascertain that the premises and the conclusions are not themselves morally objectionable.

Next in this chapter, the common assumption that the 'IVF' human embryo must qualify as a 'person' or a 'human being' in order to warrant protection from invasive and destructive research is critiqued. Specifically, it is argued that the ethics of 'IVF' human embryo research should not be determined *a priori* on the basis of a definition of personhood or humanhood adopted for the purposes of defending a preconceived position on the question of embryo research. Instead, we should examine more closely what duties we ought to impose upon ourselves *vis-a-vis* 'IVF' human embryos, irrespective of whether they qualify as persons or humans.

In the following chapter, arguments that attempt to side-step the issue of personhood or humanhood focusing instead on the possible societal consequences of 'IVF' human embryo research are considered. First, the anticipated benefits of 'IVF' human embryo research are briefly discussed. This is followed by a detailed account of some of the potential harms: civil contention and disobedience; the coercion and exploitation of women; the problem of desensitization; discrimination towards handicapped persons; cloning; parthenogenesis; and

hybridization.

The conclusion reached is that the potential benefits of embryological research are significant, but so too are the potential harms, particularly as many of these are at the bottom of slippery slopes. It is then argued that in order to avoid the slippery slope of 'IVF' human embryo experimentation, independent non-arbitrary limiting principles must be added to the principles justifying 'IVF' human embryo research so as to carefully define the conditions under which such research might be justified.

In Chapter Three, a number of such ethical constraints are examined, that, if applied rigorously, would no doubt curtail many of the predicted harmful consequences of embryological research. The preconditions of ethical research that are considered include: 1) ethically acceptable research objective(s); 2) scientific merit; and 3) free and informed consent.

In examining each of these prior conditions for ethical research involving 'IVF' human embryos, the findings of some of the major government committees and professional societies as regards the nature and scope of these constraints are considered. Generally speaking, the proposed requirements for ethical embryological research are uncontroversial. There is, amongst the various proponents of such research, general agreement as to the importance and appropriateness of these limiting principles. This is not surprising because in many

respects the constraints imposed mirror those for research involving human subjects. There is, however, an important discrepancy between these two kinds of research. One basic ethical principle governing research involving human subjects is that "no experiment should be conducted where there is a priori reason to believe that death or disabling injury will occur."[19] With research involving 'IVF' human embryos, if this principle were to apply then most research would effectively be prohibited. And so, instead, with embryological research this basic principle is replaced with a principle that restricts research to a particular developmental stage.

In the second half of the chapter a number of the proposals for limiting 'IVF' human embryo research in this way are critically examined. Also considered is the proposal for restricting 'IVF' human embryo research on the basis of the distinction between therapeutic and non-therapeutic research. None of these approaches proves to be uncontroversial, however. Thus, the challenge for Chapter Four is to identify an appropriate limiting principle that might effectively balance the competing moral claims of the 'IVF' human embryo and medical science, without relying upon an arbitrary biological dividing line or the therapeutic/non-therapeutic distinction.

The alternative approach to the regulation of 'IVF' human embryo research presented in Chapter Four does not attach moral relevance to the development of a particular

feature, but instead views the potential for development tout court as morally significant. In this chapter, the crucial distinction between viable and non-viable 'IVF' human embryos is introduced, on the basis of which a distinction between morally acceptable and unacceptable embryological research is argued for. Specifically, the moral acceptability of research on non-viable 'IVF' human embryos is defended. In support of the thesis proposed, a sustained analysis of what is morally wrong with killing is provided, to show that none of the concerns associated with the act of killing apply to the destruction of non-viable 'IVF' human embryos.

Non-viable embryos, unlike viable ones, are incapable of ongoing human growth and development given available medical technology and are expected to die imminently. In virtue of this lack of potential, it is argued that non-viable 'IVF' embryos are morally equivalent to other human somatic cells and are deserving of no more protection from life-threatening actions than other human cell clusters.

Viable 'IVF' human embryos on the other hand, have, in addition to the intrinsic value of life, value that derives from their potential for continued development. This additional value strengthens the viable 'IVF' human embryos' claim to protection such that, whereas the value of most scientifically and ethically sound embryological research is sufficient to outweigh the value attributable to non-viable 'IVF' human embryos, it is not sufficient to

outweigh the value attributable to viable embryos.

In the final chapter, potential objections to the use of a non-viability criterion for research on spare 'IVF' human embryos are critically examined. First, a number of consequentialist objections to the positive thesis are considered. These challenges are presented in the form of questions: 1) From a scientific perspective, would research on non-viable 'IVF' human embryos be legitimate? 2) Could all of the embryological research presently contemplated be done on non-viable 'IVF' human embryos? 3) What becomes of the non-viability criterion once it is possible to manipulate dying 'IVF' human embryos so as tc ensure their viability? 4) Would it be morally acceptable to create non-viable 'IVF' human embryos intentionally for research purposes? and 5) Does the argument provided for destructive research on non-viable 'IVF' human embryos justify, in advance, life-threatening research on babies born dying and dying comatose patients? In turn, each of these questions is answered showing clearly that research on non-viable 'IVF' human embryos is both scientifically valid and ethically defensible.

Next, the claim that research on non-viable 'IVF' human embryos is instrinsically wrong is briefly discussed with specific reference to the Catholic Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day.[20] The assumption underlying this viewpoint is that all human

life is sacred because every human being is created in God's image. In this chapter it is acknowledged that if one holds this belief, then the proposal for limited research on non-viable 'IVF' human embryos is, in principle, morally unacceptable. Significantly, however, if one holds the secular equivalent of the sanctity of life principle, which is that life is intrinsically valuable, then there is the possibility of a rapprochement between this belief and the proposal for limited embryological research on non-viable 'IVF' human embryos because the two beliefs are not inconsistent.

This analysis is followed by a more general commentary on some of the merits of the positive thesis. One of the important benefits of the non-viability criterion for ex utero research on spare 'IVF' human embryos is that the proposed moral demarcation line is not subject to the charge of arbitrariness levelled against other arguments for limited research. This is because there is no attempt to defend an arbitrary time limit for embryological research. With existing proposals for limited research the risk of sliding down the slippery slope of embryo experimentation is significant given the absence of a reasonable, non-arbitrary limiting principle.

A second, equally important, consequence of the introduction of a moral distinction between viable and non-viable 'IVF' human embryos is that if, for a specific research project, viable 'IVF' human embryos were used --

it having been shown that, in this instance, the prima facie obligation to protect viable embryos was outweighed by other values -- then there would be a further category of experimental subjects available for study. As such, prior to any research involving viable human embryos being undertaken, preliminary research could be done on non-viable 'IVF' human embryos so as to limit the wastage of viable ones. Also, it would be appropriate for non-viable 'IVF' human embryos to be used in preference of viable animal embryos.

A third benefit with the proposed alternative is that it allows for a consistent approach to the treatment of developing human life. Specifically, the implications for abortion, fetal research, and the non-treatment of defective newborns are considered.

For these reasons the argument for limiting embryological research primarily to non-viable 'IVF' human embryos is a reasonable alternative to existing proposals for restricting embryological research that rely on the identification of an arbitrary moral demarcation line between acceptable and unacceptable research.

NOTES

[1]The term 'embryo', technically, only applies after implantation is complete. In the schedule of human development this occurs approximately 14 days after fertilization. Prior to this, the proper scientific terms for the entity at different developmental stages are: zygote, morula, and blastocyst. In this dissertation, however, the term 'embryo' is used in accordance with common usage to refer to the developing being from conception up until eight weeks, at which time (for the human species) there is an arbitrary transition from 'embryo' to 'fetus'. For reasons of brevity and simplicity it seemed appropriate to use the term 'embryo' in this way. Alternatively, the term 'pre-embryo', recently introduced into the scientific literature, could have been used, but as the use of this term might suggest an attempt to finesse some of the more difficult moral questions, the term 'embryo' was chosen.

[2]Normally, only one oocyte matures per ovulatory cycle. With hormonal hyperstimulation, however, several oocytes can mature per cycle in each of the ovaries. For example, when clomiphene and human menopausal gonadotropins (hMG) are used in combination, three or more preovulatory oocytes are routinely recovered from patients. See Robert Edwards,

"Clinical Aspects of In Vitro Fertilization," in Human Embryo Research: Yes or No? ed. The Ciba Foundation (London: Tavistock Publications, 1986), 41-42.

[3]Capacitation is a process that involves a number of changes to the sperm plasma membranes, before which even mature sperm cells are incapable of fertilization. That is, they are incapable "of binding to or penetrating the zona pellucida or vitellus." T.G. Cooper, The Epididymis, Sperm Maturation and Fertilization (Berlin: Springer-Verlag, 1986), 42.

[4]Robert Edwards, "Clinical Aspects of In Vitro Fertilization," 44.

[5]Usually, 85% of the oocytes collected fertilize successfully. See Robert Edwards, "Clinical Aspects of In Vitro Fertilization," 44.

[6]Albert Yuzpe et al., "Rates and Outcome of Pregnancies Achieved in the First 4 Years of an In-Vitro Fertilization Program" Can Med Ass J 140, no. 2 (15 January 1989): 171; John Hobbins, "Selective Reduction -- A Perinatal Necessity?" N Engl J Med 318, no. 16 (21 April 1988): 1062.

[7]Albert Yuzpe et al., "Rates and Outcome of Pregnancies Achieved in the First 4 Years of an In-Vitro Fertilization Program," 171.

[8]John Hobbins, "Selective Reduction -- A Perinatal Necessity?" 1062.

[9]Ian Kennedy, "Let The Law Take on the Test-Tube" Times (London) May 26, 1984.

[10]J. Cohen et al., "**In Vitro** Fertilization: A Treatment for Male Infertility," Fertil and Steril 42: 422-32, cited by Robert Edwards, "Clinical Aspects of **In Vitro** Fertilization," 44.

[11]Robert Edwards, "Clinical Aspects of **In Vitro** Fertilization," 49.

[12]It is difficult to estimate the actual cost of IVF-ET therapy per treatment cycle. At University Hospital in London, Ontario the operating budget is 1.2 million dollars for approximately 600 cycles. This amount excludes any costs incurred for laboratory testing and drugs. Personal communication, Albert Yuzpe, Department of Gynaecology, University Hospital and the University of Western Ontario, London, Canada.

[13]There are many difficulties in estimating the success rates of IVF-ET therapy due to the lack of uniform standards on the basis of which results are calculated. For example, some clinics exclude from their calculations failures occurring before ET whereas other calculate their success rate in terms of pregnancies following laparoscopy or transvaginal ultrasound. For this reason care must be taken to ascertain what the denominator is, i.e. does the percentage reflect a success rate per number of patients, per treatment cycle, per egg collection, or per embryo transfer. Recent statistics from a Canadian clinic indicate that the take home-baby-rate is 10% per embryo transfer and 8% per oocyte retrieval per couple. See,

Albert Yuzpe, "Rates and Outcome of Pregnancies Achieved in the First 4 Years of an In-Vitro Fertilization program," 170. By comparison, in England (1986) the mean live birth rate in large treatment centers was 19.2% per embryo transfer and 14.7% per egg collection. See, Voluntary Licensing Authority, The Third Report of the Voluntary Licensing Authority for Human In Vitro Fertilisation and Embryology 1988 (Sussex: Sumfield and Day Ltd., 1988), 19.

[14]Robert Edwards, "The Current Clinical and Ethical Situation of Human Conception **In Vitro**" Galton Lecture of the Eugenic Society, in Developments in Human Reproduction and their Eugenic Ethical Implications, ed. C.O. Carter (London: Academic Press, 1983), 97.

[15]The Ciba Foundation, Human Embryo Research: Yes or No? (London: Tavistock Publications, 1986), 58 (See comment By David Baird).

[16]Gordon Dunstan, "Ethical Problems Raised by the New Techniques in Human Procreation," paper presented at the Academy of the Kingdom of Morocco Session II, 1986 (27 - 29 November): 5.

[17]Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day (Vatican City: The Congregation, 1987), 30.

[18]For the sake of economy, and to simplify matters, the terms 'ex utero' and 'spare', are often omitted throughout the disseration when referring to the embryos used for

research purposes, but these qualifiers should be understood.

[19]"The Nuremberg Code" from Trials of War Criminals Before the Nuremberg Military Tribunals. Vol II, The Medical Case (Washington D.C.: U.S. Government Printing Office, 1948). Reprinted in Experimentation with Human Beings, ed. Jay Katz (New York: Russell Sage Foundation, 1972), 305.

[20]Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day, 16-17.

CHAPTER ONE

MORAL STATUS AND THE ETHICS OF **EX UTERO** RESEARCH ON SPARE 'IVF' HUMAN EMBRYOS

Introduction

At issue in the debate concerning the moral acceptability of experimenting on spare 'IVF' human embryos are important questions concerning how we should treat the early human embryo. Too often, however, these questions are side-stepped. Instead of directly considering how the 'IVF' human embryo should be regarded and what kind of protection it should be given, the focus is on the question of moral status.

Commonly, both the proponents and the opponents of 'IVF' human embryo research maintain that in order to resolve the compelling issues surrounding the ethics of embryo research, the moral status of the intended research subject -- the 'IVF' human embryo -- must first be determined. Not surprisingly, therefore, a survey of the relevant literature reveals a common focus on questions of moral status: "Is the 'IVF' human embryo 'truly human'?" ask some authors; "Is it 'a person'?" question others; "Does it have a 'right to life', or is it merely due 'respect'?"; "Can it be destroyed with impunity, or is its destruction intrinsically wrong?"[1]

In response to one or other of these questions,

authors writing on the moral acceptability of 'IVF' human embryo research commonly pursue a similar course. They outline their understanding of the relevant moral concept(s), answer the corresponding status question, and then detail the implications of their view for 'IVF' human embryo research. Either the 'IVF' human embryo is a being with moral standing and so it should not be used for research that is inherently destructive, or alternatively, the 'IVF' human embryo has little or no moral standing, and may be used as research material.

Within this broad framework, there are at least four distinct strategies for determining which, if any, moral rights should be ascribed to the 'IVF' human embryo.[2] The first two strategies involve analogical reasoning. In one instance, moral status is determined by comparing the 'IVF' human embryo to an entity that resembles it. If the two are sufficiently similar, in most if not all morally relevant respects, it is presumed that whatever status is usually attributed to the entity in question should also be attributed to the 'IVF' human embryo. In the second instance, hypothetical stories are elaborated and it is suggested that our common intuitions regarding an appropriate course of action in these hypothetical instances should inform our ethical attitudes towards the 'IVF' human embryo. With the third strategy, the focus is on identifying the one or more characteristics essential for personhood or humanhood. Here, the 'IVF' human

embryo's moral standing is determined by measuring embryo against proposed definitions of either concept to see whether it qualifies as a being with a serious moral right to life. The last of the four strategies examines the moral relevance of potentiality. The potential of the 'IVF' human embryo is explored to see whether it is a being capable of achieving personhood or humanhood. On the basis of this potentiality, or lack thereof, moral rights are attributed or denied.

In this chapter, each of the four strategies for determining moral status is examined in turn, with particular attention given to those arguments (exemplifying each strategy) that are commonly used to decide the morality of ex utero research on spare 'IVF' human embryos. These status-based arguments are briefly outlined, and their implications for research on 'IVF' human embryos noted. Deficiencies in each argument are exposed, so that the alleged implications for embryological research do not follow. Finally, it is argued that any attempt to resolve the controversy surrounding embryological research that relies exclusively on the assumption that a proper analysis of moral standing can resolve all disputes regarding the rights and obligations owed to others is unnecessarily limited.

Use of analogy

Arguments from analogy can be used effectively to support decisions regarding the morality of a particular

action. In such instances,

> [the] arguments work by bringing an undisputed case to bear on a disputed or problematic case. The claim is made that the cases are relevantly similar and, for example, that since the analogue is known to be evil, the primary subject is evil also. 3

As concerns the ethics of 'IVF' human embryo research, arguments from analogy are sometimes used to reason from a clear case of morally acceptable (unacceptable) research to the problematic case of embryological research. The 'IVF' human embryo is compared to an entity that presumably resembles it in most, if not all, morally relevant respects. On this basis, it is then argued that since research upon the entity with which the embryo is compared is morally acceptable (unacceptable), so too research upon the 'IVF' embryo is (is not) morally acceptable.

Those relying upon arguments from analogy to claim full protection for the 'IVF' human embryo, usually compare the embryo to the normal adult human, as he/she is generally taken to be the paradigm of a being with full moral status. The two are compared to determine whether there are sufficient morally relevant similarities to warrant granting the 'IVF' human embryo the <u>same</u> moral status as the adult of the species. So doing would in effect preclude 'IVF' human embryo research, as the embryo would have the right not to be tortured as well as the right to life.

A comparison of the two beings reveals that the 'IVF' human embryo and the adult human are similar in that both

are members of the species Homo sapiens -- they have the same genotype. However, whereas an adult of the species with normal capacities is typically able to communicate, to act autonomously, to be conscious of the world and his/her existence in that world, and to experience pleasure and pain, the 'IVF' human embryo is unable to do so. With these considerations in mind, the crucial question is whether the presence of the characteristic forty-six chromosomes is more or less significant than some of the other characteristics that are also distinctive of the species. On balance, in addressing this question writers maintain that species membership in and of itself does not constitute sufficient grounds for attributing full moral rights to the 'IVF' human embryo.[4]

Amongst those who believe that the human embryo is not relevantly similar to the full-fledged adult human being, and so does not merit similar treatment, are those who instead compare the 'IVF' human embryo to a cluster of cells[5] or to a human corpse.[6]

Writers who maintain that the early 'IVF' human embryo is in morally relevant respects more like a cluster of human cells than like anything else insist upon the fact that both embryos and cell clusters are non-integrated organisms of similar morphology.[7] Clifford Grobstein, for one, notes that a careful examination of the ovum prior to, "or some time after fertilization reveals few of the characteristics by which we recognize a person. What is

revealed are all the characteristics of a single human cell."[8] To this claim Phillip Montague would add that if any special moral status were to be attributed to the embryo by virtue of its potential, a similar status would have to be attributed to all cells of the human body because theoretically these are also potential beings, given the possibility of parthenogenesis and cloning. This, he implies, would be absurd.[9]

If the analogy outlined above is sound, then the 'IVF' human embryo is deserving of no more respect than that owed to human cell colonies. In this view there would be very few, if any, arguments against or limitations upon research involving 'IVF' human embryos. Whatever might legitimately be done to human cell cultures (as are commonly used in laboratory analyses) could likewise be done to 'IVF' human embryos. As such, scientific curiosity would be sufficient to justify invasive and destructive 'IVF' human embryo research.

Ethics demands consistency; similar cases <u>should</u> be treated similarly. Thus, as concerns the above argument for 'IVF' human embryo research, the crucial question is whether the embryo is sufficiently similar in morally relevant respects to a cluster of human cells to justify treating the embryo as we would treat other living human cells. In considering this question at least one notable difference between the entities compared emerges -- only the 'IVF' human embryo is <u>inherently</u> capable of

regeneration. Even granting that it is theoretically possible for the unfertilized human ovum (by means of parthenogenesis), and for the human somatic cell (by means of cloning), to develop into a "complex and differentiated human individual", only the human embryo is capable of so developing without chemical stimulation or some other direct manipulation. This potential for <u>self-initiated</u> development serves to establish a relevant dissimilarity between the 'IVF' human embryo and other cells in the human body. The argument for 'IVF' human embryo research based on the analogy between the embryo and other living human cells is, therefore, unsound.

Alongside those who maintain that the 'IVF' human embryo should be treated like any other human cell are a few who argue that the embryo should be treated as we would treat a human corpse. On this account, two specific constraints would restrict 'IVF' human embryo research. First, the research would have to be consented to by the gamete donors and, second, it would have to be respectful of the research subject. To expand upon this last point, respect for the human person the deceased once was, at the very least, demands that all manner of frivolous or unnecessary research upon the human corpse be prohibited. A similar respect for the humanity of the 'IVF' human embryo would require that any research involving it be directed towards relevant scientific, therapeutic or diagnostic problems.

If the 'IVF' human embryo is to be used for research purposes, then presumably it is preferable that such research be consented to, and that it be directed towards legitimate objectives. But this preference aside, why should we suppose that the rights and obligations that usually apply to human beings after death should also apply to human beings during the initial period of life?

Those who maintain that the early 'IVF' human embryo and the human corpse should be treated equivalently, presumably base their conclusion on the fact that both lack neurological activity. It does not follow, however, that because the early 'IVF' human embryo and the human corpse have in common an absence of electrical activity, that decisions concerning the ethics of 'IVF' human embryo research should be made on the basis of those considerations that apply to research upon human corpses. Even if one allows that both entities might not be entitled to full moral status for the very same reason, it does not follow that their moral status is equal. In fact, it need only be shown that morally relevant dissimilarities exist between the 'IVF' human embryo and the human corpse, for the one to be attributed a greater moral status than the other. Three such dissimilarities are briefly examined here. Two confer moral advantage upon the 'IVF' human embryo; one favours the <u>corpus</u>.

The first important difference between the early 'IVF' human embryo and the human corpse is that with the embryo

the absence of neurological activity may only be temporary, in which case the embryo may be alive. The relevant criterion for determining the death of humans is the permanent loss of electrical activity in the brain and usually this can be detected using the electroencephalogram (EEG).

This test, however, cannot distinguish between the permanent or temporary cessation of brain functions and for this reason a flat EEG does not always signal death. For example, when the cessation of brain function is induced by hypothermia or central nervous system depressants it is common to test for cerebral perfusion in order to determine whether the loss of electrical activity is permanent. Similarly, it is possible for a seriously asphyxiated newborn to have a flat EEG but to later recover brain functions. For this reason, during the first week of life cerebral blood flow is considered by some to be a more helpful test in ascertaining death.

A similar situation prevails with respect to the early 'IVF' human embryo; respecting the principles underlying the definition of death, and the unique biological characteristics of the embryo, requires that we not mechanically apply criteria of death appropriate to adults, in all instances. Prior to the 40th day of embryonic development no electrical activity can be detected and measured. It is unknown, however, whether this absence is permanent or temporary. For this reason other criteria and

tests for determining death are commonly used. Up until the 15th day after fertilization, the criterion for determining the death of the 'IVF' human embryo is stoppage of the division of the cells. If the early embryo metabolizes, respires, responds to changes in the environment, grows, and divides, then it is alive and only temporarily lacking neurological acivity.[10] Then, from about the 20th day to the 40th day of embryonic development it is the stoppage of the heart beat that determines death. Only thereafter, is the absence of electroencephalographic waves relevant.[11] The point then is that if it is the absence of life -- which for the human species is defined as the permanent absence of electrical activity in the brain -- that robs a being of his/her moral standing, then the living 'IVF' human embryo may be deserving of a greater moral status than the human cadaver, although both lack neurological activity.

A second morally relevant difference between the early 'IVF' human embryo and the human corpse that also suggests the embryo may be deserving of greater moral status concerns the potential of the 'IVF' human embryo. The embryo, though it has never been a person, has the "potential" to become one. The deceased, on the other hand, has no potential -- never more will it be a person.

But why look to the future and not to the past? The 'IVF' human embryo has the potential to become a person, but that potential may never be realized. The deceased, on

the other hand, once was a full-fledged member of the moral community, and by virtue of this may claim special moral standing. Conversely, prior to coming into being, the 'IVF' human embryo is without moral status, and so cannot make any claims on the basis of previous standing. On these grounds, one could reasonably argue that the corpse and not the 'IVF' human embryo is owed greater moral status. In sum, as concerns the proposed analogy between the 'IVF' human embryo and the human corpse, not only do the differences noted undermine the original comparison, they also suggest conflicting viewpoints.

Also reasoning by analogy, but from another tack, one could compare the more developed 'IVF' human embryo to a discrete human organ, and argue on this basis that the 'IVF' human embryo should be treated as we would treat any human tissue or organ available either for transplantation or for research.[12] With this comparison, 'IVF' human embryo research would be morally acceptable provided that a valid consent was obtained first from the gamete donors.

In common law, the next of kin (or the state) have limited property rights over the corpse for the purpose of disposal. In addition, limited rights over the body have been granted by statute (to the state, the individual, or the next of kin) to permit organ donation. As such, the law confers upon the organ donor, the relative(s) of a deceased person, or the state limited rights of use or disposal for the purpose of burial, live and cadaveric transplantation,

autopsy, and post-mortem research. Likewise, the law could ensure that the gamete donors retain a right of possession over the 'IVF' human embryo. This would mean that just as organ donors, or persons lawfully in possession of a corpse, must consent to the removal of an organ(s) that is to be used for scientific research, so too gamete donors would have to consent to research upon their embryo(s).

The argument is straightforward, but is the analogy upon which it rests sound? Is the 'IVF' human embryo sufficiently similar, in morally relevant respects, to a kidney or to a liver to warrant simply transposing the rules governing research on severed human organs to 'IVF' human embryos? In my view, the answer to this question is "no", for a crucial difference sets the two apart. The 'IVF' human embryo despite its early developmental stage is a <u>whole</u> being. If it is allowed to grow in a non-hostile uterine environment, it will in the fullness of time usually develop all of the functioning and interacting tissues and organs that make up a human being. On the contrary, a human organ is merely <u>part of</u> a human being. This difference clearly undermines the proposed analogy.

Another plausible argument from analogy suggests that in a single, critical respect the developing human is like one of the "higher" animals -- primarily a "feeling", not a "thinking" being. On this view, few constrainsts would be imposed upon 'IVF' human embryo research, because even if the early development of the structure which will serve

as the substrate for nociception (i.e. pain perception) were sufficient for the 'IVF' human embryo to qualify as a "feeling" being, the embryo would not so qualify until the last two weeks of embryonic development. Recent research findings indicate that the neural pathways for nociceptive activity only begin to appear in the perioral area about the seventh week post-fertilization.[13] Given the above analogy, only from the seventh week onward might the 'IVF' human embryo be entitled to the respect afforded dogs, mice, etc.; that is, only thereafter would frivolous research, as well as research that inflicted needless pain and suffering, be prohibited.

But is the developing human more similar, in morally relevant respects, to an animal than to an adult member of the species? This question is crucial, and with it we come full circle to compare once again the 'IVF' human embryo to the full-fledged adult. We already know, however, that in morally relevant respects the two are dissimilar. Furthermore, there are also important differences, not to be overlooked, between the 'IVF' human embryo and the human cell, human organ, and human corpse. What then might the 'IVF' human embryo rightfully resemble?

The last analogy to be considered holds that whatever moral status is attributed to human ova and sperm, should also be attributed to early 'IVF' human embryos (two to sixteen cells). On this reasoning, as it is currently acceptable to routinely discard or destroy human gametes

(e.g. through masturbation or contraception), so too it would be acceptable to discard or destroy 'IVF' human embryos. Accordingly, most, if not all, embryological research would be countenanced.

The controversial claim upon which this suggestion rests -- that human gametes and early human embryos are morally equivalent -- is defended by Helga Kuhse and Peter Singer.[14] In a brief paper on the moral status of the embryo, they recount a series of imaginary stories to suggest that fertilization is a morally insignificant act. These stories are considered next.

Artificial Cases

Arguments from analogy sometimes involve the use of artificial cases intentionally designed to elicit certain intuitions. These intuitions are used to suggest how one might properly resolve a particular moral debate. This method of argumentation can be extremely effective in clarifying those aspects of a given controversy that are particularly complex; but frequently, its effectiveness is diminished. Often when artificial cases are presented, much energy is expended analyzing the adequacy of the hypothetical scenario described instead of critically assessing the underlying argument. There is a tendency, as such, for the real issue not to be addressed. Nonetheless, artificial cases can be used to illustrate, in a cogent manner, a specific viewpoint.

With the abortion debate Judith Jarvis Thomson,[15] Michael Tooley,[16] and others introduced powerful arguments using artificial cases. By comparison, few writers have done so in addressing any of the difficult questions surrounding the ethics of 'IVF' human embryo research. Kuhse and Singer are notable exceptions. They discuss the moral status of the early 'IVF' human embryo by recounting three imaginary stories that focus on the rights of, and obligations owed to, spare laboratory-fertilized human embryos.

The first story describes a situation in which it is discovered that a participant in an IVF-ET program has a medical condition that prevents implantation. The discovery is made prior to the fertilization of the ova, and as it would be pointless to proceed with fertilization (since it would be impossible for the woman to establish a pregnancy) the ova and semen are "tipped, separately, down the sink."[17]

The second story is identical to the first, except that fertilization has occurred prior to the participants being informed of the woman's medical condition. The problem is what to do with the fertilized ova, assuming the option of freezing or donating the embryo(s) is rejected.

The third story is analogous to the first in that the couple is informed of the woman's medical condition prior to fertilization and the gametes are tipped down the sink separately. The sink is blocked, however, which means that

the discarded ova might be fertilized unintentionally. Should the ova be rescued?

Against this background, Kuhse and Singer argue that if it is legitimate to discard or destroy human ova and sperm prior to fertilization (the first story), then it is also legitimate to discard or destroy unwanted early 'IVF' human embryos (the second story). Common sense should tell us, Kuhse and Singer maintain, that conception does not in and of itself confer moral status, nor does it strengthen the claim for moral standing based on the doctrine of potentiality. Whether the ova are discarded one minute before or one minute after fertilization, makes no moral difference, argue Kuhse and Singer. They write elsewhere, "if it is cake we are after, it doesn't make much difference whether we throw away the ingredients separately, or after they are mixed together."[18] As to the third hypothetical scenario, since it is morally acceptable according to Kuhse and Singer to discard or destroy unwanted early 'IVF' human embryos, it would be absurd to insist upon a moral obligation to rescue ova that may have been fertilized inadvertently.

From this, one might surmise that Kuhse and Singer would approve of 'IVF' human embryo research. This is confirmed in a subsequent paper of theirs that characterizes such research as morally acceptable if undertaken prior to the twenty-eighth day of embryonic development.[19] Singer and Kuhse maintain that research on

'IVF' human embryos is morally objectionable only if it is undertaken past the point at which the embryo is capable of experiencing pain. As this is estimated to be somewhere around the sixth week post-fertilization, the proposed twenty-eight-day limit is, from their perspective, very conservative.

This argument for limited research depends in part upon the argument from analogy described above that undermines the claim for full protection from the moment of conception onward, thereby justifying the search for a more appropriate demarcation line. The argument from analogy is most easily critically examined using B.F. Scarlett's analytic reconstruction of the argument:

> 1) It is not wrong to destroy human gametes.
>
> 2) If it is wrong to destroy human embryos there must be some difference between embryos and gametes which is the basis for this difference in moral status.
>
> 3) The basis for a difference in moral status must be either actual or potential.
>
> 4) There is no actual difference between an early embryo and a gamete that is sufficient to make such a difference in their moral status.
>
> 5) There is no difference in potential between embryos and gametes.
>
> 6) So there is no difference in moral status between embryos and gametes.
>
> 7) So it is not wrong to destroy embryos. [20]

As Scarlett notes, the first premise of the argument -- that "it is not wrong to destroy either the egg or sperm before they have united"[21] -- is not particularly controversial. The second and third premises, which

stipulate that if there is a difference in moral status between human gametes and human embryos some actual or potential morally relevant feature must account for this difference, are also uncontroversial.

The fourth premise, unlike the preceding ones, is, however, subject to dispute. Although it is undeniably true that the early 'IVF' human embryo has no brain or central nervous system, that it is not aware of itself or its surroundings, that it cannot experience pain, etc., it is not obvious that consciousness, rationality or sentience are <u>the</u> morally relevant characteristics a being must actually possess in order to be attributed moral rights.

Amongst those who argue that there is an actual difference between early 'IVF' human embryos and human gametes sufficient to warrant a difference in moral standing are those who believe in ensoulment, and who maintain that the soul is 'active' from the moment of conception.[22] Others focus, not on the infusion of the soul, but on some other intangible property. George Annas, for one, looks upon the human embryo as a unique and "compelling symbol of human regeneration and the future of mankind."[23] Similarly, the Ethics Committee of the American Fertility Society contends that, "the preembryo is due greater respect than other human tissue because of its potential to become a person and <u>because of its symbolic meaning for many people</u>" (italics added).[24] Still others, Teresa Iglesias amongst them, stress the importance

of the principle of unity. This principle Iglesias explains as follows:

> Human beings -- like any other creatures -- are just one entity, one being, and not a composite of two things. They are not first physical organic bodies with (at a later stage) personhood added to them by self-consciousness, making them human beings and persons. They are not human beings first and persons only subsequently ... [To] be a human being is to be a person. There are no stages in our existence at which this identity does not hold. 25

Another who focuses on the ontological status of the developing human embryo is Robert Joyce. Like Iglesias, Joyce describes the embryo's growth not as a process of development into a person, but as a process that marks the development of a person.

> No individual living body can "become" a person unless it already is a person. No living being can become anything other than what it already essentially is. 26

In arguing that the human embryo is essentially a human person, Joyce insists upon the difference between the early human embryo and its progenitor gametes. He writes,

> Before a sperm penetrates an ovum, these two cells are clearly individual cells and are parts of the bodies of the man and woman respectively. They are not whole-body cells as is the zygote cell which they crucially help to cause. They are body-part cells. The zygote is a single cell that is a whole body in itself.... The sperm and ova are not potential life. They are potential causes of individual human life. They do not, even together become a new human life. In the fertilization process, they become causes of the new human life. 27

According to Joyce, during the fertilization process the sperm and ovum cease to be and, at this time, a new being -- the zygote -- comes into existence.

The fifth and final premise of Kuhse and Singer's

argument is also contentious. It follows from this that "everything that can be said about the potential of the embryo can also be said about the potential of the egg and sperm."[28] This presumption is plausible if one assesses potentiality solely in terms of possible end-states. On this understanding of the concept, there is no significant difference in potential between the embryo and its progenitor gametes. Potentiality, however, need not be conceptualized in this way. It may, for instance, be assessed in terms of probabilities.

One who invokes the notion of probability in his argument from potential is the Roman Catholic theologian John Noonan Jr. He writes,

> As life itself is a matter of probabilities, as most moral reasoning is an estimate of probabilities, so it seems in accord with the structure of reality and the nature of moral thought to found a moral judgment on the change in probabilities at conception ... If a spermatozoon is destroyed, one destroys a being which had a chance of far less than 1 in 200 million of developing into a reasoning being, possessed of the genetic code, a heart and other organs, and capable of pain. If a fetus is destroyed, one destroys a being already possessed of the genetic code, organs and sensitivity to pain, and one which had an 80 per cent chance of developing further into a baby outside the womb who, in time, would reason. 29

As it happens, the statistics cited above are not consistent with subsequent (including current) estimates, and to some degree they are also irrelevant because embryological research involves the destruction of embryos and nct fetuses.[30] Nevertheless, the point is that there is a higher probability of a child coming into being from

an embryo than from sperm and egg, and so one might say, following Noonan, that there is a corresponding morally significant difference in potential between the developing embryo and the progenitor gametes.[31]

From another perspective potentiality might be thought of, not in terms of that which is physically possible, nor in terms of that which is probable, but rather in terms of that which is likely given certain capacities that are actually present. On this understanding of the concept an important difference surfaces between the embryo and the gametes. For although it is possible for "ova and sperm if united" to become a person, only the embryo is actually capable of so doing. Consider, in this regard, Aristotle's conception of potentiality:

> In all cases where the generative principle is contained in the thing itself, one thing is potentially another when, if nothing external hinders, it will of itself become the other. E.g., the semen is not yet potentially a man; for it must further undergo a change in some other medium. But when, by its own generative principle, it has already come to have the necessary attributes, in this state it is now potentially a man, whereas in the former state it has need of another principle. 32

Here, the emphasis is not on a difference in degree, but rather on a difference in kind. Following the writings of Aristotle, Richard Werner asserts that,

> ... unlike the fetus immediately prior to birth and the baby immediately afterward, there is a significant and important difference between the ovum and sperm immediately before fertilization and the zygote immediately afterward. Given the proper environment the embryo, qua itself, is a growing, developing organism. All things being equal, the zygote will grow into a person. On the other hand, the ovum or sperm qua itself is neither growing nor developing no matter

> in what sort of environment one should find it in or put it into (italics added). 33

Not only are the gametes inherently incapable of further development, but in the normal course of events they very often do not become embryos, not to mention persons. As Kuhse and Singer themselves note, in defense of their first premise,

> Every normal female between puberty and menopause wastes an egg each month that she does not become pregnant; and after puberty every normal male wastes millions of sperm in sexual intercourse in which contraceptives are used, or in which the woman is not fertile; and the same applies when he masturbates or has a nocturnal emission. 34

These last few criticisms may seem misplaced, at first glance, given that the gametes' collective potential is not considered. The reason for this is that although in the latter stages of the argument Kuhse and Singer speak of the gametes as "separate but considered jointly", this is not the case at the outset. Recall that the first premise of the argument holds that it is legitimate to destroy "the egg or the sperm before they have united" (italics added).[35] It may be that Kuhse and Singer intended to argue that it is legitimate to destroy "the egg and sperm about to be united", so as to then argue that there was no difference in potential between the embryo and the egg and sperm if united. But the argument in support of the first premise considers only the destruction of gametes "separate, not considered jointly".

Leaving aside, however, this problem of equivocation, the fifth premise remains contentious even if one considers

the collective potential of the ova and sperm. For example, there would still be a higher probability of a child resulting from an embryo than from "egg and sperm about to be united", because even under optimal conditions not all eggs fertilize. Singer and Kuhse acknowledge this fact,[36] but they dismiss the difference in probability as slight. And as for potentiality defined as the unfolding of an actual capacity, in this instance the very notion of collective potential comes under attack for ignoring the difference between "what is" and "what could be". In a suitable environment, the embryo is capable of developing into a child; the egg and sperm "considered jointly" are only capable of so doing <u>if</u> they unite. The crucial point here is that if potentiality is of ethical relevance, then the number of <u>independent</u> factors included in the conditional part of the "if-then" clause, as well as the likelihood of occurrence of each of these factors, is significant. This is particularly so if the independent factors are subject to human choice and not the laws of nature.

In sum, for those who intuitively believe that there is a moral difference between discarding or destroying human ova and sperm about to be united, and discarding or destroying 'IVF' human embryos, the argument woven through the three imaginary stories will not be persuasive. <u>Per contra</u> Kuhse and Singer, it may be that the argument from potential is not very compelling, but as Annas notes:

> It is much more compelling than Singer and Kuhse give it credit. Although a human embryo is another development along a continuum, it is a significant one. It will not do simply to equate it with an egg and a sperm: the embryo is an entity quite distinct, and is rightly looked at and valued as more than the sum of its parts. Jonathan Glover's analogy notwithstanding, I assume that neither he nor Singer and Kuhse would be pleased if he ordered cake in a restaurant and was presented with milk, sugar, flour, eggs, and a mixing bowl. 37

Up to this point several arguments from analogy have been closely examined, and in turn each argument presented has been critically assessed. In the process, no convincing argument supporting a conclusion regarding the ethics of 'IVF' human embryo research has emerged. This suggests that perhaps arguments from analogy, whether they involve the comparison of entities or events, cannot unequivocally resolve the question of moral status. In a further effort to ascertain which, if any, moral rights are owed the 'IVF' human embryo and to determine on this basis whether research involving the 'IVF' human embryo is morally acceptable, a fundamentally different approach to the question of moral status is considered next.

Defining Personhood or Humanhood

Another strategy for determining the moral status of 'IVF' human embryos focuses upon the attribution of moral agency. Generally speaking, with this approach a more or less sophisticated version of the following argument is presented.

First, the morally relevant terms are identified and some account is given as to how these terms might be used

in a normative as well as a descriptive way. For some, an important distinction is introduced at this stage between the terms 'human' and 'person' according to which 'human' is a biological term that denotes species membership, and 'person' is a moral term that denotes membership within the moral community. On this account, not all humans are persons and not all persons are human. Others, however, do not mention personhood. Instead, they equate moral agency with humanhood, and may or may not recognize a morally relevant difference between 'human being' and 'being human'.

Second, the essential characteristics of personhood or humanhood are specified. Next, an appropriate moral demarcation is proposed that, in theory, corresponds to the characteristic(s) identified. For example, if the definitive criterion of moral standing is the ability to feel pain, the relevant demarcation line may be drawn at that time when the neural pathways necessary for nociceptive activity (i.e. "pain perception") become present. (Alternatively, for reasons of caution, the demarcation line may be drawn at some earlier time). Finally, entities of unknown or uncertain moral status are evaluated in relation to this moral dividing line to determine what value, rights, and protection they are due. The underlying assumption is that entities on one side of the moral dividing line are, by definition, full-fledged members of the moral community (whether labelled person or

human), whereas those on the opposite side fail to so qualify.

This particular strategy is, in principle, straightforward. In practice, however, there are problems with this conventional, formulaic approach when it is used to decide difficult questions concerning the morality of specific activities. The existence of multiple, conflicting definitions of personhood or humanhood, each of which lists different morally relevant features, and the absence of any mechanism for adjudicating between these, means that no authoritative decision regarding the moral acceptability or unacceptability of a proposed course of action can ever be reached. This limitation aside, status-based arguments, couched in the language of personhood or humanhood, are commonly advanced by those with strong convictions regarding the morality of 'IVF' human embryo research.

At one end of the continuum are definitions of personhood or humanhood that exclude not only the human embryo or fetus, but also the young infant during the first months of life. At the other extreme are arguments for attributing full moral status to the human embryo from the moment of conception, or some slightly later time, onward. And ranged between these extremes are a number of other characterizations of either concept. A representative sample of these various accounts of moral agency are examined next, starting with those that are most

restrictive.

We begin with the writings of Locke. In his principal work, An Essay Concerning Human Understanding, he defines a person as,

> a thinking intelligent being, that has reason and reflection, and can consider itself as itself, the same thinking thing at different times and places; which it does only by that consciousness which is inseparable from thinking, and, it seems to me, essential to it. 38

In this Essay, Locke distinguishes the concept of man from that of person, characterizing the former as the physical being and the latter as the rational self. On this account, self-consciousness or more precisely the exercise of capacities associated with self-consciousness, establish personhood.

Writing in the tradition of Locke, Michael Tooley argues that an appropriate understanding of the concept of personhood clearly reveals that neither the embryo, the fetus, nor the neonate are entities possessing a serious right to life, i.e. persons. In his article "Abortion and Infanticide" (written during the early nineteen seventies in the midst of the debate over the morality of abortion) Tooley defends the following claim:

> An organism possesses a serious right to life [i.e. is a person] only if it possesses the concept of a self as a continuing subject of experiences and other mental states and believes that it is itself such a continuing entity. 39

For Tooley, the notion of "unified consciousness over time" is pivotal; in his opinion, this is the property that confers upon an entity the status of person. Insisting on

this point, he writes some years later:

> The non-potential property that makes an individual a person -- that is, that makes destruction of something intrinsically wrong, and seriously so, and that does so independently of the individual's value -- is the property of being an enduring subject of non-momentary interests. 40

A philosopher who shares Tooley's understanding of personhood but who, unlike Tooley, attempts to identify the characteristics or properties of personhood that an entity must have in order to have full moral status is Mary Anne Warren. She maintains that the following criteria are central to the concept of personhood:

> 1. consciousness (of objects and events external and/or internal to the being), and in particular the capacity to feel pain;
>
> 2. reasoning (the developed capacity to solve new and relatively complex problems);
>
> 3. self-motivated activity (activity that is relatively independent of either genetic or direct external control);
>
> 4. the capacity to communicate, by whatever means, messages of an indefinite variety of types, that is, not just with an indefinite number of possible contents, but on indefinitely many possible topics;
>
> 5. the presence of self-concepts, and self-awareness, either individual, or racial, or both. 41

Significantly, the criteria listed above are not all proposed as necessary and sufficient conditions for personhood. Warren acknowledges that probably criteria (1) through (3), and possibly even (1) and (2) alone are sufficient. (As concerns the moral status of the 'IVF' human embryo, however, these qualifying statements are irrelevant, since the embryo satisfies none of the criteria

listed.)

With self-consciousness as the threshold criterion for personhood, the 'IVF' human embryo necessarily fails to qualify as person. A logical consequence of this, assuming there is no special need to concern oneself with the welfare of non-persons, is that the 'IVF' human embryo could legitimately be used as research material.[42] Thus argue some of the more zealous proponents of 'IVF' human embryo research.[43] The argument, however, is not compelling as the characterization of personhood upon which it rests is highly controversial on at least two counts.

It follows logically from the claim that only self-conscious rational agents have a right to life that infanticide and other killings would be morally permissible. This consequence affronts the moral sentiments of many. Also, a further uneasiness is caused by the absence of a clear moral demarcation line. Self-consciousness is something that cannot be observed directly, but must be inferred. Proponents of this criterion for personhood are therefore loath to propose a precise moral dividing line between persons and non-persons. This makes it all but impossible to ascertain with any degree of certainty whether entities that are not obviously self-conscious are genuine persons. For instance, what about individuals afflicted with Alzheimer's disease? As the dementia increases the capacities generally associated with self-consciousness diminish. Are

the afflicted individuals to lose their moral standing at some critical point? If so, when? Similarly, what about individuals suffering from amnesia? Are they to join the ranks of non-persons? The inability to answer such questions with any degree of certainty represents a serious difficulty.

The next account of personhood along the continuum stipulates that it is at the moment of birth and not before that humans become persons. In assessing various arguments regarding the onset of personhood Joseph Fletcher categorically rejects the view that prenatal life is "human in the sense of a person, a 'human being' or a 'nascent human being, with a right to life'."[44] He remarks that,

> The most sensible opinion is Plato's, that a fetus becomes a person at birth -- after it is expelled or drawn from the womb, its umbilical cord cut, and its lungs start to work. 45

Fletcher maintains that persons "have to have individual or separate existence ('viability') and they have to be actually 'sapient' -- that is, possessed of a functioning cerebral cortex -- some minimal level of intelligence."[46] Leaving aside the second criterion, however, he acknowledges that "the nearest thing to a specifiable 'moment' for <u>becoming</u> human [in a moral sense] is when a fetus is respirated after birth -- that reflexive and explosive gulp of air starting the lungs to work."[47]

This account of personhood is not widely espoused by other moral theologians or philosophers. A version

thereof, however, (minus the minimal intelligence criterion) is well entrenched in the common law tradition.[48] This position is also defended in several sections of the Canadian Criminal Code;[49] the statement most directly in point being,

> 206(1) A child becomes a human being within the meaning of this Act when it has completely proceeded, in a living state, from the body of its mother whether or not
>
> (a) it has breathed,
> (b) it has independent circulation, or
> (c) the navel string is severed.

With birth as an absolute moral dividing line, assuming once again that only full moral agents are entitled to protection from destructive research, unlimited research on 'IVF' human embryos would be permitted. With birth as a primary legal demarcation line, however, nothing follows in law with respect to this kind of research. Although the fetus is not a legal person until after birth, it is not the case that the fetus has no rights in law.[50] As such, the law could either permit or prohibit 'IVF' human embryo research on the basis of other considerations.

As concerns the issue at hand, the human fetus develops no special qualities or characteristics at birth that could possibly justify the attribution of special moral standing from this time onward. There is no qualitative difference between the newborn and the fetus about to be born, and more importantly still, there is no such difference between the late fetus and the very early premature newborn.

This claim Fletcher denies. According to him, "being human is two things essentially -- intelligence and 'going it alone' as an individual on one's own lungs."[51] To be sure, the newborn is physiologically independent of the mother. There is no reason, however, to grant this fact moral significance because in every other respect the newborn is still very much dependent upon others, particularly his/her mother, for survival. In addition, it is also important to note that this criterion of moral standing may be overly exclusive. For example, it rules out not only the newborn with mild lung disease that requires additional oxygen, but also the adult patient with poliomyelitis who has lost all spontaneous pulmonary function and requires an iron lung for survival. Finally, as to the further claim that persons are necessarily "sapient" beings, suffice it to say that the minimal intelligence criterion, like the self-consciousness requirement, entails morally unacceptable consequences as concerns the treatment of those with limited or minimal intelligence.

An alternative account of moral agency, one that is less restrictive than the previous two, suggests that the developing fetus achieves full moral standing when it reaches the stage of viability. On some accounts, fetal viability refers to "an achieved state of maturity."[52] The viable fetus is a fetus sufficiently well developed (anatomically and functionally) to survive outside of the

womb by natural means alone. Others, however, define fetal viability in such a way that the fetus' survival outside of the mother's womb need not be independent of external support or technology. Presently, this would mean that a developing human would become a full-fledged member of the moral community at approximately twenty to twenty-two weeks. This is when the fetus is sufficiently well-developed to have a reasonable chance of survival if born, given presently available medical technology (i.e. technology that is in principle available).[53] With either of these definitions of fetal viability, unrestricted 'IVF' human embryo research could proceed.

Fetal viability is, however, an unacceptable criterion of moral standing. Viability defined as the capacity to survive ex utero without "artificial aid" is problematic in that,

> all infants depend to some extent on artificial support well beyond the newborn period. Examples range from complex medical care to such basic but 'artificial' needs as pasteurized milk, clean water, and an artificially heated environment. 54

Moreover, as noted previously in discussing the merits of independence as a criterion of moral standing, not only premature newborns, but also many adults depend upon medical technological support for survival. Another example would be the neonate or young adult with a cardiac rhythm abnormality who required a pace maker to live. Complete independence of external support is thus an inappropriate criterion of moral standing.

In addition, technologically-assisted viability is also an inappropriate boundary for personhood or humanhood because the fetus' ability to survive ex utero in a modern intensive care unit is only of moral significance with respect to specific medical controversies. For example, if the issue is whether to resuscitate a premature newborn or whether to initiate (or continue) treatment of a severly handicapped neonate, then clearly the newborn's ability to survive given presently available medical technology is morally relevant. If the fetus is not capable of surviving in a modern neonatal intensive care unit, then agressive medical interventions are unwarranted.

By comparison, with the abortion controversy the moral significance of technologically-assisted fetal viability is puzzling, particularly if one distinguishes between evacuation of the fetus and fetal destruction. Why should the fetus' ability to live independent of the mother be sufficient reason to forbid the mother from forcing the fetus to live independently?[55] Alternatively, why should the fetus' inability to live independently be sufficient reason for the mother to have the fetus expelled?

Technologically-assisted viability is a concept that tells us about the environment in which the fetus can survive and the technical limits of neonatology. These facts are morally relevant in resolving specific medical dilemmas (e.g., the treatment of defective or extremely premature newborns). They are of limited moral

significance, however, as concerns the broader issue of moral standing.

Moving further along the continuum, another proposed determinant of moral agency is the onset of fetal brain activity. On this account, the developing being becomes the subject of full moral rights when it manifests some degree of neurological activity -- this being a necessary component of autonomy, consciousness, rationality, etc., characteristics deemed to be morally relevant. Because brainstem activity begins (i.e., can be detected and measured) around the seventh week of embryonic development, six weeks is generally proposed as a rationally defensible boundary for invasive 'IVF' human embryo research.[56] Some, however, recommend a more conservative time limit.[57]

Those who adhere to this particular account of personhood or humanhood often defend their position on the grounds of consistency.[58] They insist that because personhood or humanhood ends with the permanent loss of brain function (i.e., total brain death), so too it should begin with the onset of brain activity. For one, Glanville Williams writes,

> On the assumption that men are <u>rational</u> animals ... we can demand a degree of consistency between their views of when a human life begins and when a human life ends. If EEG is to determine the moment of death, EEG should be decisive in determining the moment of life's beginning. 59

At first glance, it may seem like a good idea for there to be consistency between the definition of life and

the definition of death, particularly if this might resolve the issue of moral standing in an objective manner, i.e., without reference to a specific biomedical issue. The search for consistency at this level, however, is problematic because the definition of death finesses the critical question: Is the morally relevant characteristic a specific ability or property, or is it the potential for a specific ability or property? With death all capacities and all potential are concomitantly exhausted; at the beginning of life, however, there is much potential waiting to be realized. On this point Robert Veatch writes,

> When one irreversibly loses the critical capacity -- circulatory, integrative, or mental -- one simultaneously loses any potential for that capacity. It will never return again. However, at the beginning of life the potential for a capacity far precedes the presence of the capacity itself ... In order to know when one should be treated as a member in full standing of the human community, one must know whether the elusive critical feature we have been searching for is a capacity or a potential. 60

A further difficulty with the proposed criterion is that it rests on a point of confusion. As previously suggested, it is not the absence of electrical activity per se that denies the biological human membership within the moral community. Rather, it is the absence of life -- that entails the absence of autonomy, consciousness, rationality, sentience, potentiality, etc. -- that robs a human of his/her moral standing. As such, there is no necessary connection between moral status and encephalographic activity. There is no reason, therefore, to assume that it is only with the first signs of neural

function that the living 'IVF' human embryo gains moral standing. The onset of neurological activity is but one step along the developmental continuum and no more or less morally relevant than any other step in the normal course of embryonic development.

Moreover, it is important to note that death isn't merely the absence of electrical activity in the brain. To be precise, death is the irreversible absence of such activity. With the embryo, the absence of electrical activity may only be temporary, in which case "there is no reason to regard its absence as decisive on the personhood issue."[61]

Another possible criterion of moral standing is individuality. Modern biology teaches us that, up until fourteen days post-fertilization, it is possible for two genetically identical individuals (i.e., monozygotic twins) to be created by a process of twinning. Similarly, it is possible for two different embryos to fuse together, thereby creating a human chimera. Because of the possibility of twinning and recombination, advocates of the individuality criterion generally maintain that humans become full-fledged members of the moral community at "the time at or after which it is settled whether there will be one or two or more distinct human individuals."[62]

One who maintains that twinning and recombination argue against the claim that life begins at conception is Fr. John Mahoney. In discussing the question of when ensoulment

takes place, he writes,

> the possibility of twinning and recombination in every conceptus (whether it occurs spontaneously or n t) argues against a biologically stable subject for such immediate animation. 63

In this view, "irreversible individuality" is attained once twinning and recombination are no longer possible, and only thereafter must the 'IVF' human embryo be afforded protection against invasive research. Prior to this, such research may or may not be permitted depending upon whether the 'IVF' human embryo is deemed worthy of respect sufficient to prohibit such manipulation.

A similar account of when life begins to be inviolate is advocated by Paul Ramsey who, like Mahoney and others, maintains that the embryo becomes a distinct genetic entity, a unique elf, once segmentation is complete and twinning and recombination are no longer possible:

> If there is a moment in the development of these nascent lives of ours subsequent to fertilization and prior to birth (or graduation from college) at which it would be reasonable to believe that human life begins and therefore begins to be inviolate, that moment is arguably at the stage when segmentation may or may not take place. 64

Here, again, individuality is the determinant of moral standing. Believing this feature to be assured post-segmentation, Ramsey maintains that the developing human gains full moral rights at the blastocyst stage. On this understanding, invasive research would not be permitted beyond two to three weeks post-fertilization, and probably also would be forbidden prior to this time -- not on

account of rights, but on account of the respect owed the early 'IVF' human embryo.

A problem with segmentation as a proposal for when life begins is that although 'observable' splitting usually occurs between seven and fourteen days post-fertilization (with some splitting occuring after fourteen days) it is arguable that "'duality' may be established before the individuals actually divide."[65] That is, prior to segmentation there may already be a genetic factor present that determines the number of individuals there are going to be, and what is currently missing is an appropriate means of testing for this. In response to this Ramsey notes that,

> If it can be shown in the future that 'splitting' is already established from conception, that, I would say, would pull the rug out from under the argument from segmentation. 66

A further difficulty with attributing moral standing on the basis of segmentation is that although individuality is a morally relevant characteristic, in that the entities we now recognize as moral agents normally neither split nor fuse, it is not obvious that this characteristic should be the primary determinant of moral standing. For instance, why should the possibility that two individuals might emerge from one embryo lessen the embryo's claim to moral standing instead of increasing it?

Contra Mahoney, Ramsey, and others, John Noonan Jr., maintains that the probability of twinning and recombination is so small that it may be dismissed. On his

account, the human embryo should be viewed as a full moral agent from the moment of conception onward.

In defense of this particular demarcation line, Noonan argues that with conception there is a significant change in biological probabilities -- the conceptus having the greater chance of developing into a "reasoning being". This difference in probability is cited as evidence of the non-arbitrary character of the proposed moral dividing line. The real argument in support of the claim for full moral status from conception onward, however, rests on what Noonan calls the theologians' criterion of personhood: whosoever is the product of human gametes, and is born of human parents, is morally human. For Noonan all 'IVF' human embryo research should be proscribed:

> It is wrong to kill humans, however poor, weak, defenseless, and lacking in opportunity to develop their potential they may be. It is therefore morally wrong to kill Biafrans. Similarly, it is morally wrong to kill embryos. 67

This argument for attributing full moral standing to the human embryo from the moment of conception onward is widely criticized. Some argue that the presence of a human genetic code only establishes genetic humanity, and that "in the absence of any argument showing that whatever is genetically human is also morally human,"[68] the claim for full moral standing from conception onward must be discounted. Others maintain that if such an argument were provided, it should be dismissed, because there is no reason to suppose that the presence of a human genetic code

is both a necessary and sufficient condition for the possession of full moral rights. As Levine notes, if the presence of a human genetic code is morally relevant, in and of itself, "then a choriocarcinoma or a hydatidiform mole is an instance of protectable humanity."[69]

Clearly these criticisms are valid. They are, however, somewhat misdirected when levelled at Noonan. In claiming full moral standing for the developing human embryo, he carefully stresses not only that the embryo is human in origin, but also that it is potentially a mature 'human being'.[70] Specifically, Noonan argues that, minus evidence to the contrary, there is a probable continuity between a human embryo and a being with full moral standing. Because one should not discriminate in matters of life and death solely on the basis of age, the human embryo, therefore, should be attributed full moral standing from conception onward.

To evaluate the merits of this argument properly, the moral relevance of the 'IVF' human embryo's potential requires further elaboration.

The Potentiality Principle

Arguments based on the doctrine of strict potentiality hold that potential entities should be treated as if they were that which they could become. Accordingly, all 'IVF' human embryos should be attributed the same moral status as adult humans (paradigm persons) by virtue of their inherent

capacity (i.e. potentiality) for becoming adult members of the species. In this view, 'IVF' human embryo research is morally objectionable because it violates the 'IVF' human embryo's fundamental right to life: invariably such research is destructive. Likewise, such research is considered morally unacceptable because it violates the subject's right to non-interference: the 'IVF' human embryo does not consent to being a research subject.

The latter of these two criticisms is misplaced. The proper analogue to research involving 'IVF' human embryos is research on incompetent, rather than competent, human subjects. With research involving incompetents, the common requirement is the consent of a parent or legal guardian, and not the consent of the research subject. Construed in this way, the issue is not the lack of consent on the part of the 'IVF' human embryo but rather the appropriateness of parental (or other legally recognized) consent to research.

As this last objection is misplaced, it need not be seriously entertained. The prior objection, however, must be carefully evaluated.

At least one national body with a mandate to study certain aspects of <u>in vitro</u> fertilization has developed its recommendations against 'IVF' human embryo research on the presumption that the 'IVF' human embryo is entitled to full moral standing by virtue of its developmental potential. The Australian Senate Select Committee On the Human Embryo Experimentation Bill 1985 describes the 'IVF' human embryo

"as genetically new human life organised as a distinct entity oriented towards further development."[71] Appealing to this definition, the Committee argues that the 'IVF' human embryo "should be regarded as if it were a human subject for the purposes of biomedical ethics" (italics added).[72]

The "respect for capacities" version of the potentiality argument, as outlined above, is subject to criticism on several counts. For example, an objection raised by Stephen Buckle points to a problem of identity. According to Buckle, the entity with full moral standing that comes into being at the end of the developmental process is not the same entity as the fertilized egg:

> The identification cannot be made (that is, the embryo proper is not the same individual as the fertilised egg, differing only in being at a later stage of development) because the changes that the fertilised egg undergoes are not changes through which it develops into, or itself becomes, the embryo proper. Rather, it undergoes a process of differentiation in which the various cells developed in the earliest stages after fertilisation take on a range of different functions, only one of which is the development of the embryo proper. 73

On this reasoning, Buckle insists that the fertilized egg has the ability to produce a full-fledged member of the moral community, but not the ability to become such a being. At first glance, this contention may seem plausible; it is, however, seriously flawed. The fact that the zygote (i.e. the fertilized egg) becomes the placenta, amnion, and chorion, in addition to becoming the "embryo proper" in no way undermines the zygote's ability to become

the embryo that in turn becomes the full-fledged member of the moral community.

A second difficulty with the strict potentiality criterion, identified by Joel Feinberg and others, is that it involves a logical error -- that of deducing "actual rights from merely potential (but not yet actual) qualification for those rights."[74] The charge, in this instance, is that the potential for full moral standing does not logically ensure full moral status. As Singer puts it, "Prince Charles is a potential King of England, but he does not now have the rights of a king. Why should a potential person have the rights of a person?"[75] Or to quote Stanley Benn,

> If A has rights only because he satisfies some condition P, it doesn't follow that B has the same rights now because he could have property P at some time in the future. It only follows that he will have rights when he has P. He is a potential bearer of rights, as he is a potential bearer of P. A potential president of the United States is not on that account Commander-in-Chief. 76

If one focusses exclusively on rights, then the distinction insisted upon between potential and actual persons may, in fact, be morally relevant. If the focus is on duties, however, then the distinction noted is of little significance.[77] To clarify this point, while it may be true that Prince Charles does not have the rights of a king, he is entitled to certain respect, and certain duties are owed to him, because he is the potential King of England. A potential person may not be entitled to the rights of a person, but that does not mean that the respect

and duties owed to actual persons might not rightfully be accorded potential persons.

Another common objection to the claim for full moral standing from the moment of conception onward is that this leads to absurd consequences. Consider the following: if research involving the 'IVF' human embryo is to be prohibited on the grounds that the embryo is entitled to full moral status, then it follows logically that the use of IUDs and post-coital contraceptives should be proscribed, that material expelled in a miscarriage should be treated as one would treat a child who had died accidentally, that women should be coerced to continue unwanted pregnancies, and perhaps even that women should be compelled to accept the transfer of orphaned 'IVF' human embryos. This suggests that the presumption in favour of full moral standing for the 'IVF' human embryo is, at the very least, problematic.

In light of this objection to the strict potentiality criterion, some argue that protection for developing human life should not be absolute. They maintain instead that protection should be granted on an incremental basis, i.e., that the potentiality principle should be supplemented by a proportionality principle.[78]

On this account, developmental potential does not guarantee the embryo absolute (unconditional) respect from the moment of conception onward. Rather, potentiality demands for the 'IVF' human embryo a respect that, although

profound, may yield to other values. As such, depending upon the degree of moral weight accorded to the 'IVF' human embryo, research might be permitted within precise constraints intentionally designed to be respectful of the embryo as it continues to develop towards personhood or humanhood.

Richard McCormick resolves this critical issue, for himself, in the following way:

> I believe that there are significant phenomena in the preimplantation period that suggest a different evaluation of human life at this stage from that made of an established pregnancy (spontaneous wastage, twinning, recombination of fertilized ova, hydatidiform mole, appearance (or not) of primary organizer, etc.). Therefore, I do not believe that nascent life makes the same demands for respect at this stage that it does later. On this basis, I was able to approve -- not without fear and trembling -- preliminary research aimed at eventual safe embryo transfer. 79

Kass, on the other hand, though he also believes that relative respect and not equal moral status is owed the 'IVF' human embryo, resolves the issue differently. He concludes that 'IVF' human embryo research is incompatible with the respect that is owed the early 'IVF' human embryo:

> Invasive and manipulative experiments involving such embryos very likely presume that they are things or mere stuff, and deny the fact of their possible viability ... the respect for human embryos for which I have argued -- I repeat, not their so-called right to life -- would lead one to oppose most potentially interesting and useful experimentation. 80

McCormick and Kass both agree that the 'IVF' human embryo ought not to be accorded full moral standing. They disagree, however, as to the level of respect that ought rightfully to be attributed to the developing embryo, and

this leads them to espouse opposing conclusions as concerns the moral acceptability of research involving spare 'IVF' human embryos. This sort of disagreement places in sharp relief what is perhaps the most important problem with the gradualist approach to the potentiality argument -- the absence of consensus as to the degree of the gradation.

This aside, of the status-based arguments considered, the one that retains any moral force after critical assessment is the "respect for capacities" version of the potentiality principle.

The Insufficiency of the Status-based Approaches to 'IVF' Human Embryo Research

There are several problems with the status-based approaches to 'IVF' human embryo research, not the least important of which concerns the uniform failure to achieve any kind of consensus regarding the moral status of the 'IVF' human embryo. As the above survey of the relevant literature suggests, the status debate remains, to the chagrin of many, unresolved. Despite numerous valiant attempts to determine what, if any, value should be attributed to the developing human, no consensus has been achieved as regards the properties or characteristics a being must have in order to be attributed full moral standing.

This failing is of particular significance because generally the first premise of any status-based argument

(whether for or against embryological research) speaks to the status of 'IVF' human embryos. Recall the logic of these arguments, which is essentially as follows:

> -'IVF' human embryos are (are not) full-fledged members of the moral community (i.e. 'persons' or 'human beings').
> -Full-fledged members of the moral community have rights including an inviolable right to life as well as a right not to become a research subject without appropriate prior consent.
> -Therefore, 'IVF' human embryos have (do not have) rights including an inviolable right to life as well as a right not to become a research subject without appropriate prior consent.

From this it follows that if 'IVF' human embryos are moral agents and the proposed research is potentially destructive, then the research should not be undertaken because this would violate the 'IVF' human embryos' right to life. If, on the other hand, the research is not destructive, and so would not violate the embryos' right to life, then presumably it could proceed providing that appropriate consent was obtained first. Conversely, if 'IVF' human embryos do not qualify as full-fledged members of the moral community, then regardless of the nature of the research, there would be no <u>prima facie</u> reason why 'IVF' human embryos could not be experimented upon. On this reasoning, given the presumption that <u>ceteris paribus</u> only entities with full moral standing warrant <u>absolute</u> protection from invasive and destructive research, it is imperative that the status of 'IVF' human embryos be determined before pronouncing on the ethics of 'IVF' human embryo research. The lack of agreement on the question of

moral status is, therefore, quite significant.

In part, this disagreement may be explained by the fact that the status question is not amenable to factual resolution. In short, there is a problem of verification. Personhood or humanhood are prescriptive as well as a descriptive terms, and therefore they are not verifiable in the same way that descriptive terms usually are. Definitions of 'person' or 'human being' (as distinct from 'being human') are imbued with subjective considerations (perceptions, preferences, interests and objectives), that in turn are informed by differing cultural standards, parental teachings, and religious pronoucements, regarding the morality of certain practices. On this point Sissela Bok writes,

> The different views as to when humanity definitely begins are little dependent upon factual information. Rather, these views are representative of different world-views, often of a religious nature involving deeply held commitments with moral consequences. There is no disagreement as to what we now know about life and its development before and after conception; differences arise only about the names and moral consequences we attach to the changes in this development and the distinctions we consider important. [81]

Consequently, arguments, evidence, and other forms of justification may be advanced in support of a particular understanding of the concept of personhood or humanhood, but the evaluation itself can neither be proven nor disproven as it is neither true nor false.

Personhood or humanhood are concepts of the kind W.B. Gallie describes as essentially contested -- concepts "the

proper use of which inevitably involves endless disputes about [their] proper uses on the part of [their] users."[82] This essential contestedness argues for attempting an alternative approach to the issue at hand -- an approach that is not predicated upon a shared understanding of either concept. One such approach focuses on the duties that exist regarding 'IVF' human embryos. Whereas the status-based approaches concern themselves with the legitimacy of the various right claims made on behalf of 'IVF' human embryos, the alternative approach examines more closely the duties imposed upon bona fide right-holders.

To some, the suggestion made above may seem like irresponsible sophistry because rights generally entail correlative duties (unless, of course, they are based on privilege or power of attorney). There are grounds, however, for advocating a reformulation of the relevant questions in terms of duties rather than rights (e.g. "ought 'IVF' human embryos to be protected from destructive research?" vs. "do 'IVF' human embryos have a right to life?").

Those concerned with rights perforce focus the debate on the prospective right-bearer: "Is he/she/it entitled to the rights claimed?" "Is he/she/it capable of invoking the right(s) others claim on his/her/its behalf?" "Does he/she/it have the ability to value his/her/its own life?" and so on. Conversely, those concerned with duties may expressly focus their attention on the value considerations

that determine which obligations are owed to which entities. By comparison, this discourse is far richer, at both a descriptive and a prescriptive level than the previous one, in which the notion of rights and the concept of personhood or humanhood tend to function as premature ultimates closing off, far too abruptly, interesting avenues of investigation.[83]

On this point Benjamin Freedman insists that,

> We must resist the common temptation to turn the situation topsy-turvy. Our current obsession with the idea of rights has led us to the position that rights are at least a primary determinant of what we ought to do. In contrast, I suggest that the correct analysis is that we determine what we ought to do, how we ought to behave, and then our statement of rights serves to formalize our commitment to this ethical way of acting. [84]

According to Freedman, in ethics the crucial questions are: "what ought we to do?", and "how ought we to behave?" -- not "does this entity have any rights?" For it is primarily in the process of addressing these questions that one can identify principles of ethics that may provide some direction as to what constitutes right conduct.

This understanding of morality is echoed by Mary Warnock in a discussion of some of the difficulties common to definitions of personhood (viz. the definition may be overly inclusive or exclusive, the definition may fail through uncertainty, etc.).[85] Warnock first suggests that when contemplating the ethics of 'IVF' human embryo research, one might appropriately bypass the concept of personhood altogether, focussing instead upon the notion of

rights. Then, taking the argument one step further, Warnock rejects the notion of rights so as to explicitly consider what protection is owed to 'IVF' human embryos. In this two-step fashion it is argued that one should not worry about whether embryos are persons and whether they have rights, but instead should directly consider how embryos ought to be treated. On this same point Warnock argues elsewhere that,

> whether or not something has a moral right is quite explicitly a question of moral judgement. It therefore seems clearest to give up talking either about personhood or about rights in the question of the status of the embryo. In the first place the two concepts are not independent, but stand or fall together. But secondly, they are both, as it turns out, dependent on adopting a certain moral stance about how the embryo ought to be regarded, what degree of protection it ought to be afforded. 86

Following Freedman, Warnock and others, one might posit the existence of a rule or principle of duty and obligation that demands the protection of 'IVF' human embryos, and let this establish their moral standing. Presently the moral rules governing our behaviour impose upon us prima facie obligations to respect and protect all sorts of entities that traditionally are not thought of in terms of personhood or humanhood, such as corpses, animals, sacred objects or artifacts, and the environment. Similarly, there might exist a duty to respect and protect 'IVF' human embryos.

Jane English contends that "... our concept of a person is not sharp or decisive enough to bear the weight of a solution to the abortion controversy. To use it to

solve that problem is to clarify obscurum per obscurius."[87] The findings of this chapter suggest that the same is true with respect to the current controversy. There really is no reason to filter the question of 'IVF' human embryo research through the prism of personhood or humanhood. Moral status need not be set up as a first premise on the basis of which rights and obligations are then derived. A much more promising program is to focus on the duties we impose upon ourselves with regard to these entities -- leaving aside their moral status as persons or human beings.

NOTES

[1]The current debate about 'IVF' human embryo research is analogous to the abortion controversy in that the vast majority of arguments presented either for or against research, like most of the arguments for or against abortion focus on the moral standing, or lack thereof, of the developing being. For this reason many of the arguments presented in this chapter will be familiar to those who are well apprised of the status-based arguments introduced in the abortion debate.

[2]Ruth Macklin discusses these strategies for determining personhood in her article, "Personhood in the Bioethics Literature," Milbank Memorial Fund Quarterly 61, no. 1 (1983): 35-57.

[3]Trudy Govier, A Practical Study of Argument (Belmont, California: Wadsworth Publishing Co., 1985), 227.

[4]Peter Singer, perhaps the best known critic of speciesism, criticizes the claim that species membership is an adequate basis upon which to grant the embryo rights. See, for example, Helga Kuhse and Peter Singer, "The Moral Status of the Embryo," in Test-Tube Babies: A Guide to Moral Questions, Present Techniques and Future Possibilities, eds. William Walters, and Peter Singer (Melbourne: Oxford University Press, 1982), 60.

[5]See, for example, Phillip Montague, "The Moral Status of Human Zygotes," Can J of Phil 8, no. 4 (December 1978): 697-705.

[6]See, for example, comments by Antonia Gerard, "Status of the Pre-embryo," in The Ciba Foundation, Human Embryo Research: Yes or No? (London: Tavistock Publications, 1986), 142.

[7]See, for example, Clifford Grobstein, "External Human Fertilization," Scientific American 240, no. 6 (June 1979): 57-67; Rona Gerber, "**In Vitro** Fertilization, and Embryo Experimentation: Some Moral Considerations," J of Applied Phil 3, no. 1 (1986); and, Phillip Montague, "The Moral Status of Human Zygotes."

[8]Clifford Grobstein, 'External Human Fertilization," 64. See also Clifford Grobstein, "The Moral Use of 'Spare' Embryos," The Hasting Center Report 12, no. 3 (June 1982): 6.

[9]Phillip Montague, "The Moral Status of Human Zygotes."

[10]Leon R. Kass, Toward a More Natural Science: Biology and Human Affairs (New York: The Free Press, 1985), 103.

[11]Council of Europe, Parliamentary Assembly, Report on the use of Human Embryos and Foetuses for Diagnostic, Therapeutic, Scientific, Industrial, and Commercial Purposes. Doc. 5615, September, 1986, Part C: 5.

[12]To my knowledge, with the 'IVF' human embryo research debate, no one has drawn an analogy between human tissue or organs and the human embryo. With the abortion

controversy, however, there were arguments for considering the newly implanted embryo or early fetus as morally equivalent to human tissue or organs. As these arguments would equally apply to the controversy regarding 'IVF' human embryos research, they are considered here.

[13]K.J.S. Anand and P.R. Hickey, "Pain and its Effects in the Human Neonate and Fetus," N Engl J Med 317, no. 21 (19 November 1987).

[14]Helga Kuhse and Peter Singer, "The Moral Status of the Embryo."

[15]Judith Jarvis Thomson, "A Defens of Abortion," Philosophy & Public Affairs 1, no. 1 (Fall 1971): 47-66.

[16]Michael Tooley, "Abortion and Infanticide," Philosophy & Public Affairs 2, no. 1 (Fall 1972): 60-62.

[17]Helga Kuhse and Peter Singer, "The Moral Status of the Embryo," 58.

[18]Peter Singer and Helga Kuhse, "The Ethics of Embryo Research," Law, Medicine & Health Care 14, no. 3-4 (September 1986): 136.

[19]Ibid., 137.

[20]B.F. Scarlett "The Moral Status of Embryos," J of Med Ethics 10, no. 2 (June 1984): 79-81. Scarlett acknowledges that his reconstruction of Kuhse and Singer's argument includes two premises that are not explicit in the original text (the second and third premises).

[21]Helga Kuhse and Peter Singer, "The Moral Status of the Embryo," 57.

[22]Although the doctrine of immediate animation is commonly associated with Catholicism, there is no positive teaching statement made by the Roman Catholic Church as to the precise time at which the human soul is infused. Traditional Catholic teachings dictate that the conceptus must be respected and protected from the moment of conception onward, irrespective of ensoulment. As to the question of when the human soul is infused the Church maintains that this "is a philosophical problem from which our moral affirmation [of the prohibited nature of abortion, embryological research etc.,] remains independent for two reasons: (i) supposing a later animation, there is still nothing less than a human life, preparing for and calling for a soul in which the nature received from parents is completed; (ii) on the other hand it suffices that this presence of the soul be probable (and one can never prove the contrary) in order that the taking of life involve accepting the risk of killing a man, not only waiting for, but already in possession of his soul." Declaration on Procured Abortion published by the Congregation for the Doctrine of the Faith, 18 November 1974. Vatican Council II; More Post Conciliar Documents, ed. A Flannery (Dublin: O.P. Dominican Publications, 1982), 452.

[23]George Annas, "The Ethics of Embryo Research: Not as Easy as it Sounds," Law, Medicine & Health Care 14, no. 3-4 (September 1986): 139.

[24]The Ethics Committee of the American Fertility Society, "Ethical Considerations of the New Reproductive Technologies," Fertil and Steril 46, no. 3, Supplement 1 (September 1986): 30S.

[25]Teresa Iglesias, "**In Vitro** Fertilization: the Major Issues," J of Med Ethics 10, no. 1, (March 1984): 35.

[26]Robert Joyce, "Personhood and the Conception Event," in What is a Person? ed. Michael Goodman (Clifton, New Jersey: Humana Press, 1986), 204-205.

[27]Ibid., 202.

[28]Helga Kuhse and Peter Singer, "The Moral Status of the Embryo," 61.

[29]John Noonan Jr., "An Almost Absolute Value in History," in The Morality of Abortion: Legal and Historical Perspectives, ed. John Noonan Jr. (Cambridge, Mass.: Harvard University Press, 1970), 56-57.

[30]The figures cited by Noonan in this oft-quoted passage do not apply directly to IVF-ET therapy. Currently it is estimated that nearly sixty percent of the embryos created by IVF fail to implant. If one adds to this the number of pregnancies that end in miscarriage (which a recent study suggests may be as high as 31% (A.J. Wilcox et al., "Incidence of Early Loss of Pregnancy" N Engl J Med 319, no.4 (28 July 1988): 988) then clearly far less than 80% of embryos become children. Also, with IVF-ET therapy the ova are only exposed to about 50,000 sperm. Thus, each spermatozoon clearly has a greater chance than 1 in

200,000,000 of fertilizing an ovum. This discrepancy in numbers aside, Noonan's claim is valid -- there is a higher probability of a child coming into being from an embryo than from sperm and egg.

[31]It is interesting to note that on this reasoning there is a morally significant difference in potential between the human ovum and the human sperm. Statistically, the former has greater "potential". Robert Levine, personal communication.

[32]Aristotle, The Metaphysics, translated by Hugh Trendennick (London: William Heinemann Ltd, 1936), Chapter VII, 1049a lines 13 ff.

[33]Richard Werner, "Abortion: The Ontological and Moral Status of the Unborn," in Today's Moral Problems, 2d ed., ed. Richard Wasserstrom (New York: Macmillan Publishing Co. Inc., 1979), 57. See also, J. Finnis, "The Rights and Wrongs of Abortion," Philosophy & Public Affairs 2, no. 2 (Winter 1980): 144-156; and, Joel Feinberg, "Rights of Animals and Unborn Generations," in Today's Moral Problems, 2d ed., ed. Richard Wasserstrom (New York: Macmillan Publishing Co. Inc., 1979): 581-601.

[34]Helga Kuhse and Peter Singer, "The Moral Status of the Embryo," 58.

[35]Ibid., 57.

[36]Peter Singer and Helga Kuhse, "The Ethics of Embryo Research," 136.

[37]George Annas, "The Ethics of Embryo Research: Not as

Easy as it Sounds," 139.

[38]John Locke, An Essay Concerning Human Understanding ed. A.S. Pringle-Pattison Oxford: Clarendon Press, 1924), 188.

[39]Michael Tooley, "Abortion and Infanticide," 44.

[40]Michael Tooley, Abortion and Infanticide (Oxford: Clarendon Press, 1983): 303.

[41]Mary Anne Warren, "On the Moral and Legal Status of Abortion," in Today's Moral Problems, 2d ed., ed. Richard Wasserstrom, (New York: Macmillan Publishing Co. Inc., 1979), 45.

[42]Cf. Earlier caveats regarding corpses, p. 27ff.

[43]William Walters, "Personhood and the Human Embryo," in Moral Priorities in Medical Research: The Second Hannah Conference, ed. John Nicholas (Toronto: The Hannah Institute for the History of Medicine, 1984), 179-189.

[44]Joseph Fletcher, The Ethics of Genetic Control: Ending Reproductive Roulette (Garden City, NY: Anchor Press, a division of Doubleday Books Inc., 1974), 92-93.

[45]Ibid., 171.

[46]Ibid., 171.

[47]Ibid., 171. Although Fletcher here emphasizes respiratory independence, it is interesting to note that in a paper prepared for The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research on Research on the Fetus, he contends that "an actual person ... is a human being who has left the

maternal/fetal unit, is born alive, and lives entirely outside the mother's body with an independent cardiovascular system." (3.3) He shifts even further from the respiratory criteria in "Four Indicators of Humanhood: The Enquiry Matures," The Hastings Center Report 4, no. 6, (December 1974): 6. In this article, appearing in the same year, Fletcher maintains that "neocortical function is the key to humanness, the essential trait, the human sine qua non," and does not mention independent existence as a necessary criterion for personhood.

[48]Coke, Institutes of the Laws of England (London: E. & R. Brooke, 1797) part 3, c. 7.

[49]Canada, Criminal Code R.S.C. 1970 Chap. C-34, Section 206 (1).

[50]Edward Keyserlingk, Sanctity of Life or Quality of Life in the Context of Ethics, Medicine and Law Protection of Life Series (Ottawa: Law Reform Commission of Canada, 1979), 94.

[51]Joseph Fletcher, The Ethics of Genetic Control, 171.

[52]See the paper prepared by Leon Kass for the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research in which he distinguishes between technologically-assisted viability and intrinsic viability. Leon Kass, "Determining Death and Viability in Fetuses and Abortuses," in Appendix: Research on the Fetus, National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research

(Washington, D.C.: Department of Health, Education and Welfare, 1975).

[53]The time of viability is determined on the basis of what medical technology is in principle available. The reason for this is that if the time of viability were determined on the basis of what was actually available, then viability would depend on morally irrelevant factors such as geograpical location and socio-economic background.

[54]Norman Fost, David Chudwin, and Daniel Wikler, "The Limited Moral Significance of 'Fetal Viabililty'," Hastings Center Report 10, no.6 (December 1980): 11.

[55]Ibid., 13.

[56]The earliest reported case of brainstem activity is at 6.5 weeks, see W. J. Borkowski and R. J. Bernstine, "Electroencephalography of the fetus," Neurology 5 (1955): 363; quoted in M. Flower, "Neuromaturation of the Human Fetus," J of Med and Phil 10, no. 3 (August 1985): 245.

[57]Kuhse and Singer, "The Ethics of Embryo Research," 137.

[58]Proponents of the brain activity criterion of personhood include: Baruch Brody, "On the Humanity of the Foetus," in Contemporary Issues in Bioethics, eds. Tom Beauchamp and LeRoy Walters (Encino, California: Dickenson Publishing Co., 1978), 229-240; J. M. Goldenring, "Development of the Fetal Brain," New Engl J Med 307, no. 9 (26 August 1982): 564; and, Peter Singer and Deane Wells, The Reproduction Revolution: New Ways of Making Babies

(Oxford: Oxford University Press, 1984), 98.

[59]Glanville Williams, The Sanctity of Life and the Criminal Law (New York: Knopf Publishing Co. Inc., 1957), 231.

[60]Robert Veatch, "Definition of Life and Death: Should there be Consistency?," in Defining Human Life: Medical and Legal Implications, eds. Margery W. Shaw and A. Edward Doudera (Ann Arbor, Michigan: APHUA Press, 1983), 111.

[61]Philip Devine, The Ethics of Homicide (Ithaca: Cornell University Press, 1978), 85.

[62]Paul Ramsey, "Abortion: A Review Article," The Thomist 37, no. 1 (January 1973): 191.

[63]J. Mahoney, Bioethics and Belief (London: Sheed and Ward Ltd., 1984), 81. Here, it is important to remember that according to the Church's teachings the fertilized ovum is entitled to respect and absolute protection from the moment conception onward, and that discussions about ensoulment have no bearing on this matter. See n. 22 supra.

[64]Paul Ramsey, ' eference Points in Deciding about Abortion," in The Morality of Abortion: Legal and Historical Perspectives, ed. John T. Noonan Jr. (Cambridge, Mass: Harvard University Press, 1970), 66-67.

[65]Paul Ramsey, "Abortion: A Review Article," 191.

[66]Ibid., 191-192.

[67]John Noonan Jr., "Deciding Who is Human," Natural Law Forum XII (South Bend, Ind: Notre Dame School of Law,

1968): 134.

[68]Mary Anne Warren, "On the Moral and Legal Status of Abortion," 43.

[69]Robert Levine, personal communication.

[70]John Noonan Jr., "Deciding Who is Human," 135.

[71]Senate Select Committee On The Human Embryo Experimentation Bill 1985, Human Embryo Experimentation in Australia (Canberra, Australia: Australian Government Publishing Service, 1986), 25.

[72]Ibid., 28.

[73]Stephen Buckle, "Arguing From Potential," Bioethics 2, no. 3 (July 1988): 238-239.

[74]Joel Feinberg, "Potentiality, Development and Rights," 145.

[75]Peter Singer, Practical Ethics (Cambridge: Cambridge University Press, 1979): 120.

[76]Stanley Benn, "Abortion, Infanticide, and Respect for Persons," in The Problem of Abortion, 2d ed., ed. Joel Feinberg (Belmont, California: Wadsworth Publishing Co., 1984), 143.

[77]The objection to the strict potentiality criterion, which highlights a logical error, rules out any appeal to the notion of potentiality as a ground for rights. It does not, however, rule out 'potentiality' as a ground for duties. This Feinberg recognizes. He notes, in his discussion of the abortion controversy, that despite the "logical point about potentiality ... it is still open to

an antiabortionist to argue that merely potential commonsense personhood is a ground for duties we may have toward the potential person." See Joel Feinberg, "Potentiality, Development, and Rights," in The Problem of Abortion, 2d. ed., ed. Joel Feinberg (Belmont, California: Wadsworth Publishing Co., 1984), 145.

[78]David B. Annis, "Abortion and the Potentiality Principle," S J of Phil 22, no. 2 (Summer 1984): 161.

[79]Richard A. McCormick, "Bioethics in the Public Forum," The Milbank Memorial Fund Quarterly 61 no. 1 (1983): 113-126.

[80]Leon Kass, Towards a More Natural Science, 108.

[81]Sissela Bok, "Who Shall Count as a Human Being? A Treacherous Question in the Abortion Discussion," in Abortion Pro and Con, ed. Robert Perkins (Cambridge, Mass.: Schenkman Publishing Co., 1974), 94-95.

[82]W.B. Gallie, "Essentially Contested Concepts" Proceedings of the Aristotelian Society Vol. LVI (London: Harrison & Sons Ltd., 1956), 169.

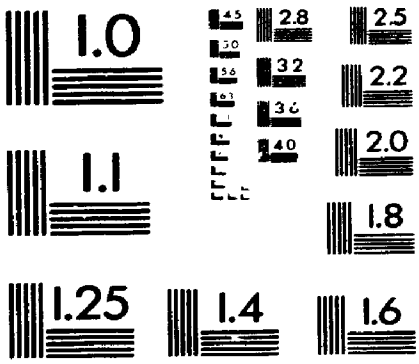
[83]This insight is borrowed from Sissela Bok, "Who Shall Count as a Human Being?: A Treacherous Question in the Abortion Discussion," 91.

[84]Benjamin Freedman, "The Entity-Restriction of Rights: Notes on a Fashion in Ethics," Metaphilosophy 12, no. 2 (April, 1981): 167.

[85]Mary Warnock, "Do Human Cells Have Rights?," Bioethics 1, no. 1 (1987).

[86]Mary Warnock, "The Enforcement of Morals in the Light of New Developments in Embryology," in Current Legal Problems 1986 (London: Stevens & Sons, 1986): 23.

[87]Jane English, "Abortion and the Concept of a Person," Can J of Phil 5, no. 2 (October 1975): 242.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CHAPTER TWO

CONSEQUENTIALISM AND THE ETHICS OF EX UTERO RESEARCH ON SPARE 'IVF' HUMAN EMBRYOS

A Concern with Consequences

Writers, as we have seen, often focus their attention on the question of moral status when attempting to resolve the controversy surrounding 'IVF' human embryo research. Of equal concern to many of these same writers, however, are the possible and probable consequences of such research. Those who determine that the 'IVF' human embryo is not entitled to the concern, respect, rights, and protection usually accorded to humans or persons, will often assess the moral acceptability of embryological research with reference to its predicted short-term and long-term consequences: They will argue either that the anticipated consequences are overwhelmingly beneficial and that 'IVF' human embryo research should therefore be permitted; or, that the possible consequences are generally harmful and that such research should therefore be condemned. On the other hand, those who maintain that the 'IVF' human embryo is a full-fledged member of the moral community will sometimes point to the potential harmful consequences of embryological research in an effort to buttress their status-based argument against the use of 'IVF' human embryos for research purposes.

In this chapter the potential benefits of 'IVF' human embryo research are catalogued. Next, the potential harms of such research are identified along with some of the ethical constraints that might appropriately be imposed upon research involving 'IVF' human embryos in order to curtail these harms. This discussion is followed by an analysis of the benefit-harm ratio that stresses the importance of introducing a non-arbitrary moral demarcation line for distinguishing between morally acceptable and unacceptable research if one is to avoid sliding down the slippery slope of 'IVF' human embryo experimentation.

The Goals and Potential Benefits of 'IVF' Human Embryo Research

In 1979 the Ethics Advisory Board of the U.S. Department of Health, Education and Welfare (HEW) -- one of the earliest groups to study the ethics of embryological research -- published the report, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer.[1] In this report, the following possible goals of research involving human embryos were identified:

1. Developing or testing more adequate contraceptives;[2]
2. Determining causes of infertility;[3]
3. Investigating the circumstances leading to the development of hyatidiform moles [sic] and their potential transformation into malignant tumors; [4]
4. Evaluating the effect of noxious agents or teratogens on the early embryo by means of an in vitro screening system; [5]

5. Studying the mechanisms by which chromosomal abnormalities are produced; [6] and

6. Investigating the totipotential cells of very early embryos to increase understanding of normal and abnormal cell growth and differentiation. [7]

Since the publication of this report, at least three other areas of research have proven to be of considerable interest: the typing of embryos for inherited defects, the use of embryonic cells for grafting, and the genetic manipulation of early embryos. Apart from these three additions, however, a decade later the immediate research goals remain essentially unchanged, and the overall objective of such research continues to be the better understanding of human reproduction and early human development.

Given this general objective and these specific goals, what are some of the more immediate potential benefits of 'IVF' human embryo research? The answer to this question, not surprisingly, varies from one respondent to another owing to differences in the evaluation of research priorities.

At present, one of the more enthusiastic practitioners of 'IVF' human embryo research is Robert Edwards who, along with Patrick Steptoe, pioneered IVF-ET therapy to treat infertility caused by tubal disorders. Edwards, for one, maintains that embryological research must continue because of the prospects for scientific and clinical advancement. These latter prospects include improving the success rates for IVF-ET therapy, preventing chromosomal and genetic

defects, and reducing developmental abnormalities. Edwards writes,

> There is no doubt that many fundamental studies of great scientific and clinical value can be carried out before organogenesis is advanced, before distinct organs have appeared in the embryo. Spare embryos could be used for improving the treatment designed to cure infertility: to test culture media, find out if growth is abnormal and if embryos can escape from the zona pellucida ... Spare embryos might also help to study the origin of some very disturbing clinical situations in women and their fetuses. There is still no clear idea of the true incidence of chromosomal imbalance in the embryo ... [Also] research on early human development could clarify how identical and conjoined twins are formed, [and] help with new methods of infertility regulation. 8

Other possible areas of study identified by Edwards as having immediate practical applications include:

> The duplication of embryos to produce identical twins, the typing of embryos for inherited defects, and perhaps the use of embryonic tissue, tailored to match a recipient, to alleviate disorders in adults. 9

One reason for learning to duplicate 'IVF' human embryos is to increase the chance of pregnancy (within the context of IVF-ET therapy) by increasing the number of embryos available for transfer when too few of the oocytes collected fertilize and cleave successfully. Another, perhaps less compelling, reason for learning to divide embryos is to cater to the whims of prospective parents who would like to have identical twins.[10]

The typing of early 'IVF' human embryos for inherited defects, another research objective identifed by Edwards, is important for infertile couples undergoing IVF-ET therapy. It will enable them to avoid unsuccessful

pregnancies, mid-term abortions for fetal indication, and the birth of seriously handicapped infants. Focussing on the second of these three possibilities Edwards notes that,

> [i]dentifying embryos with genetic abnormalities would offer an alternative to amniocentesis during the second trimester of pregnancy, and the 'abortion in vitro' of a defective preimplantation embryo, still free-living, minute and undifferentiated, would be infinitely preferable to abortion in vivo at twenty weeks of pregnancy or thereabouts as the results of amniocentesis are obtained. It would also be less traumatic for parents and doctor to type several embryos and replace or store those that are normal rather than having the threat of a mid-term abortion looming over each successive pregnancy. 11

Finally, the use of embryonic cells for grafting is believed to be an important area of embryological research because of the hope that further studies in this area could lead to cures for certain devastating neurological disorders such as Parkinson's disease. Recent clinical trials with humans on auto-adrenal medullary transplants seem promising.[12] Better therapeutic results are expected, however, with the transplantation of fetal neuronal and neuronal-like tissue (e.g., human fetal adrenal medullary cells (the adrenal medulla is a neuroendocrine organ adjacent to the kidney)). An emerging problem with fetal tissue transplants, however, is that the advanced developmental age of certain fetal tissues seems to prevent survival after implantation (e.g., human fetal dopamine neurons do not survive transplantation if the donor tissue is older than nine weeks gestation).[13] With the use of human embryonic cells for grafting there would not be this problem.

Also, recent studies with mice suggest that other devastating disorders eventually could be managed effectively by transplanting embryonic cells. As Edwards notes, Holland has shown that,

> tissues from [mouse] embryos aged day 6 and day 7 will recolonise a damaged haemopoetic system in adult recipients ... If this work could be applied to man, embryonic cells would be useful for marrow grafting, traversing histocompatibility barriers, and helpful in correcting genetic diseases such as thalassemias and anaemias, and in situations such as the clinical use of chemoradiotherapy. 14

These potential benefits in the treatment of infertility, the prevention of chromosomal and genetic abnormalities, and the treatment of debilitating diseases justify, according to Edwards, continued 'IVF' human embryo research. Others reject this contention, however, insisting that such research should be forbidden because it violates the embryo's right to life, or because the risk of abuse is far too great.

To those who reject embryological research in deference to the embryo's moral status, Edwards replies in explicitly consequentialist terms:

> Each of these studies could be of direct benefit to many patients, and should not be discarded because spare embryos must be used. I believe it is ethical to use spare embryos for these purposes, that the balance of choice insists on knowledge being gained which might be essential to an understanding of the origins and development of human disorders...
>
> ... the need for knowledge is greater than the respect to be accorded to an early embryo. 15

This belief -- that increased knowledge warrants continued 'IVF' human embryo research -- is shared by the

moral theologian Gordon Dunstan. He writes,

> ... the importance of this scientific research [i.e. research involving 'IVF' human embryos] is sufficient to rebut the presumption in favour of continuance of this precious life in the germ cells, permitting us to do it under careful regulation. 16

Others reject 'IVF' human embryo research out of fear, haunted by the spectre of the 'mad scientist' who, motivated by self-interest, engages in "evil" research. To this fear Edwards responds that,

> [t]errible Brave-New-World visions ... are based on the pessimistic assumption that the worst will happen. The whole edifice of [the] ... argument is fragile -- that nuclear physics led inevitably to the atom bomb, electricity to the electric chair, civil engineering to gas chambers. Surely acceptance of the beginning does not necessitate embracing undesirable ends? 17

To clarify this rather obscure point consider, for example, one of the more innocuous human achievements -- the invention of the hammer, a tool functionally designed for beating, breaking, striking nails, etc. Carpenters, geologists, auctioneers, and judges, amongst others, make good use of this instrument. Should functional improvements on the hammer have been restricted because someday someone might use this tool as a murder weapon? Edwards' contention is that all research, regardless of the intentions of the researcher(s), may eventually serve ends other than those for which the research was originally designed and undertaken. One cannot therefore legitimately object to 'IVF' human embryo research solely on the grounds that someone someday may eventually use the research findings to further undesirable ends.

It must be granted that the potential abuse argument is, in the abstract, unpersuasive. The strength of this argument very much depends upon a number of empirical considerations having to do with the disvalue of the anticipated consequence(s) and the likelihood of its (their) occurrence. In more general terms, the potential abuse argument is a matter for serious concern when the anticipated abuse is identifiable, extremely undesirable, very likely, and imminent; and, contrariwise less weighty when the potential abuse is not easily identified, mildly inconvenient, unlikely, and a distant possibility.

Another enthusiastic proponent of 'IVF' human embryo research is Anne McLaren. She, like Edwards, believes that embryological research will improve current methods of clinical treatment. Specifically, McLaren maintains that laboratory research on spare 'IVF' human embryos promises important medical advances in the treatment of infertility, the development of more effective and safer contraceptives, and the prevention of genetic and chromosomal disorders.

At present, less than 10% of all human embryos created in vitro result in live births.[18] A better understanding of the maturation process of the ova, the interaction of ova and sperm, the metabolic needs of the embryo in culture, and the implantation process could significantly increase this low success rate. Also, continued embryological research might not only improve IVF-ET therapy, but could also lead to the development of

alternative (more effective) treatments for infertility.

Furthermore, with an increased understanding of the human reproductive process, safer and more effective means of contraception might be developed. With barrier contraceptives (e.g. condoms and diaphragms) there are few risks or side-effects. There are problems, however, with respect to efficacy largely due to non-compliance.[19] The Intrauterine Device (IUD) is a more effective method of contraception than barrier methods, but implicates the risk of pelvic inflammatory disease and of decreased fertility.[20] By comparison, the birth control pill, an oral steroidal contraceptive, is an extremely effective means of regulating fertility; however, there are unpleasant side-effects associated with its use, and for some women the risks are quite serious.[21] With 'IVF' human embryo research alternative methods of contraception, "aimed at [the] sperm or [the] egg or the [embryo] in its early cleavage stages"[22] might be developed.

The last of the immediate research objectives identified by McLaren is the prevention of genetic and chromosomal disorders. The priority for research in this area is the development of a reliable technique(s) for diagnosing abnormalities in the 'IVF' human embryo prior to transfer. As noted previously, the development of such a technique could help infertile couples in an IVF-ET program avoid unsuccessful pregnancies, mid-term abortions for fetal indication, and the birth of seriously handicapped

infants. It might equally benefit high-risk fertile couples who could then have their embryos created in vitro and screened for abnormalities prior to transfer.

Focussing more narrowly on research objectives directly related to IVF-ET therapy, Karen Dawson emphasizes the need to test the freeze-thaw process used with human ova, to perfect techniques for the micro-injection of sperm (to treat male infertility due to oligospermia), and to develop embryo biopsy (a procedure that entails "removing one or two cells from the embryo at the eight-cell stage, freezing the remainder, and culturing the cells removed to provide ample material for cytogenetic and biochemical analysis."[23]) Also noted are the potential benefits of further study on the "processes of early pregnancy and pregnancy loss, development, differentiation, and fertilisation in humans."[24] IVF-ET therapy is at present inefficient and wasteful of embryos as well as human and financial resources. Ongoing research in each of these areas is essential if the therapy is to be improved and waste diminished.

As this brief survey of some of the relevant literature suggests, the immediate potential benefits of research on 'IVF' human embryos are significant. They include: helping infertile couples (by improving IVF-ET therapy and possibly developing alternative infertility treatments); preventing chromosomal and genetic disorders (by diagnosing and discarding defective embryos prior to transfer); treating

adults with debilitating diseases such as Parkinson's; and developing safer, more effective contraceptives.

Of equal importance, however, are the potential benefits of future research. Research on cloning, for instance, could provide:

> information concerning the interaction between the nucleus and the surrounding cytoplasm, the process by which genes are activated, and ultimately [could] provide important clues in the search for causes of malignant growth. 25

Consider also the prospects of research on parthenogenesis, which is "the initiation of early embryonic development without the participation of a fertilizing spermatozoon."[26] According to Pierre Soupart,

> [t]he rationale behind the study of parthenogenetic activation is twofold: (1) investigation of the sperm contribution to early embryonic development; (2) a more efficient means of studying spontaneous or induced mutations since parthenogenes are either haploid or homozygously diploid. 27

The specific potential benefits of research in these areas of study are, at the present time, unforeseeable. In the longer term, however, it is anticipated that at the very least an increased understanding of early human development -- the processes of cell differentiation, in particular -- could contribute to cancer research. This is because "there are close relationships between cancer cells and early embryonic cells, including shared antigens and biochemical pathways."[28]

Despite these many and varied potential benefits of immediate and future research on 'IVF' human embryos, one

could reasonably argue such research should not be countenanced because it is incompatible with the proper respect due the 'IVF' numan embryo. Alternatively, such research might be condemned on the grounds that the anticipated societal benefits are outweighed by the prospective harms. The second of these two possible objections to embryological research is considered next.

Immediate, Proximate, and Remote Prospects of Harm With 'IVF' Human Embryo Research

Undeniably, there is much knowledge to be gained from continued 'IVF' human embryo research; however, as George Annas notes, "the acquisition of important scientific knowledge is only a necessary, not a sufficient justification for experimentation."[29] Another requirement for ethical research is a neutral[30] or favorable benefit-harm ratio.[31] When assessing the moral acceptability of any proposed research protocol, it is imperative, therefore, that one ascertain at the outset not only the potential benefits of the proposed research, but also the potential harms -- both for the research subject and for society as a whole.

The proposed studies on 'IVF' human embryos either directly or indirectly result in the death of those embryos used for research purposes. Sometimes the 'IVF' human embryos are destroyed during the course of research, as when, for instance, they are squashed between glass plates for microscopic observation. Sometimes the 'IVF' human

embryos die as a result of being discarded once the research is complete. There are strong ethical proscriptions against allowing manipulated 'IVF' human embryos to continue to develop because of the potential harms for the child that might come to be. For this reason, 'IVF' human embryos that have been subjected to invasive procedures during the course of research are routinely excluded from transfer and discarded (either immediately or after further research). In addition, non-invasive research -- research that primarily involves the observation of 'IVF' human embryos during cleavage -- can also indirectly result in the death of embryos, because with this research embryos are identified as unsuitable for transfer and for this reason discarded.

Granted that most embryological research is either inherently or incidentally destructive, the question arises whether the likelihood of death for the 'IVF' human embryo should count as a serious harm when assessing the benefit-harm ratio. The answer to this question is largely based upon what moral status is attributed to the embryo. If one believes that the 'IVF' human embryo has no moral standing and that it is of little or no value,[32] then its death may be dismissed as inconsequential. At the other extreme, however, if one resolves the status question in favor of the embryo, then its death would certainly constitute a grave harm.

By comparison, the potential harms to society may be

assessed without concern for how the status debate might be resolved. Arguments against 'IVF' human embryo research that point to societal harm retain their moral force regardless of how, or whether, the 'IVF' human embryo's moral status is resolved.

Among the potential societal harms of 'IVF' human embryo research to be critically examined is the possibility that such research might engender disrespect for the law, culminating in civil contention and disobedience. Also considered is the likelihood that continued research might encourage the coercion and exploitation of both infertile and fertile women, as well as render society less sensitive to the needs of the vulnerable and the defenseless. Finally, the fears that embryological research could lead to the abolition of "motherhood" with ectogenesis, the creation of children made-to-order in accordance with parental or government specifications (germ-line gene enhancement), the fabrication of embryos for commercial purposes, cloning, parthenogenesis, cross-species fertilization, as well as other eugenic projects as yet unimagined, are all discussed under the general heading of "Brave New World" consequences.

Consider first the possibility that embryological research might engender disrespect for the law. The argument outlined, but not advocated, by R.M. Hare is as follows: There are persons who believe that 'IVF' human

embryo research is wrong. If such research is allowed these people will be greatly distressed, if not outraged. These sentiments, in turn, may cause those whose sensibilities have been offended to lose "respect for the law in general, because it does not protect their interests in this regard."[33]

One author who believes that this potential harm may be significant enough to warrant the prohibition of 'IVF' human embryo research is Ian Kennedy. He writes,

> If the law is to command respect (and therefore obedience), it must not stray too far from the collective conscience of society. If the sense of moral outrage were widely enough felt and strong enough, this would provide an additional ground, over and above any reasoned arguments, to outlaw research on embryos. 34

The harm(s) that may follow from the alienation and disaffection of a significant portion of the population over the question of 'IVF' human embryo research is also of concern to Kass. He recognizes that those who regard "the human embryo as protectable humanity ... have been very much alienated by the numerous court decisions and legislative enactments regarding abortion and research on fetuses."[35] He goes on to predict that sanctioning 'IVF' human embryo research and using public monies to "encourage and foster" this research could only further alienate this segment of the population. Kass writes,

> Technological progress can be but one measure of our national health. Far more important is the affection and esteem in which our citizenry holds its laws and institutions. No amount of relieved infertility is worth the further disaffection and civil contention

> that the lifting of the moratorium on Federal funding is likely to produce. People opposed to abortion and people grudgingly willing to permit women to obtain elective abortion but at their own expense, will not tolerate having their tax money spent on scientific research requiring what they regard as at best cruelty, at worst murder. 36

Feelings of moral outrage may indeed lead to civil contention and disobedience. Consider, for example, how clinics in the United States have been bombed and how women attending these clinics are often taunted and physically accosted by protestors.[37] Consider also the suggestion by "pro-choice" spokespersons that local elections be turned into "single-issue campaigns".[38] As concerns the practice of 'IVF' human embryo research, however, one might question the prediction that a significant number of people would be sufficiently outraged by this practice to warrant its prohibition.

Here, it is pertinent to recall that similar predictions introduced as evidence against other controversial activities have over time been proven false. For instance, Lord Devlin once argued that if homosexual acts between consenting adults were legalised in Britain there would be dire consequences for society.[39] Homosexuality was legalised; the predicted consequences did not ensue. As Nostradamus is alleged to have said, "Prediction is difficult, especially about the future."[40]

For the sake of argument, however, let us assume that the prediction of civil contention and disobedience following any attempt to legitimize 'IVF' human embryo

research is no idle threat. Given this assumption, would the "moral outrage" objection to embryological research be significant enough to warrant its prohibition?

From a consequentialist perspective there are several possible responses to this question. For instance, one might argue that the threat of civil contention and disobedience is inconsequential insofar as it could be dealt with effectively by introducing counter-threats; for example, the threat of imprisonment. Alternatively, one might decide that the likelihood of civil contention and disobedience at most suggests the need to hire a good public relations officer to quell the concerns of those who might potentially be outraged. Then again, depending upon the facts, one might conclude that the moral outrage of a significant portion of the population, coupled with the threat of civil contention and disobedience, is sufficient reason for prohibiting embryological research.

From a deontological perspective, however, the threat of a wrongful exercise of power is morally irrelevant. At most, it raises pragmatic concerns regarding the enforceability of an "unpopular" decision; it does not alter the moral problem. By analogy, a threat by white supremacists to resurrect the Ku Klux Klan, if efforts to outlaw discrimination on racial grounds continue, would not count as a legitimate moral argument against enshrining the principle of equality within the law.

Consider next the twin harms of coercion and

exploitation -- harms that are commonly conflated, but can usefully be distinguished. "Coercion is the activity of causing someone to do something against his [or her] will."[41] In general, it involves the imposition of external control using physical, emotional or moral force (either in the form of a threat or an offer) in order to achieve a specific end. With exploitation, on the other hand, there is no presumption as to how the end is obtained, but some benefit is gained at the expense, and possibly without the knowing cooperation, of another.

Those most seriously at risk of coercion and exploitation in the context of 'IVF' human embryo research are the women who submit to IVF-ET therapy, the women who donate their ova or embryos for 'IVF' human embryo research and, indirectly, all women.

Robyn Rowland, one of the feminist critics to consider the possible negative consequences of 'IVF' human embryo research for women, notes how those who participate in IVF-ET programs may be subtly coerced into donating their ova or embryos for research that is inherently exploitative. According to Rowland women who seek IVF-ET therapy are,

> in an invidious power relationship with the doctors and the medical researchers. They depend on them for a pregnancy, though only one in ten of the women will take home a baby. They are in a psychological and emotional state of need which makes them more open to the suggestions of researchers that experimentation on their embryos will assist other infertile women and may improve the failure rates of IVF. 42

(On this point it is interesting to consider the findings of two recent studies on the attitudes of women to

'IVF' human embryo research. In 1986, on the basis of a study that canvassed the opinions of women attending clinics for family planning, ante-natal care, and infertility, Alder et al. reported that over 60% of the respondents were willing to donate their ova for research purposes.[43] By comparison, Alder and Templeton reported in 1985, that 80% of the women who participated in IVF-ET therapy were supportive of ova donation for embryo research.[44])

Further, Rowland maintains that not only do women attending IVF-ET clinics risk being emotionally coerced into participating in 'IVF' human embryo research, but they also risk being exploited in the process since much of this research is not intended to help the infertile. Consider, for instance, research on sex pre-selection.[45] Many parents and prospective parents have a marked preference for male children.[46] Given this preference, it is conceivable, feminists argue, that sex pre-selection might eventually become a "tidier" form of femicide. On the basis of this reasoning, it is argued that women who are asked to consent to the use of their 'IVF' human embryos for research on sex-preselection -- research that could eventually lead to the demise of women -- are clearly being exploited.

Another form of exploitation that worries some feminists concerns the unnecessary or excess super-ovulation of infertile women undergoing IVF-ET therapy. It

is suggested that the primary reason for superovulating women seeking infertility treatment is to obtain spare 'IVF' human embryos for research purposes. This, it is argued, is an unacceptable form of exploitation -- a violation of the Kantian principle that persons should never be used solely as means to an end.

In addition, the potential harmful consequences of superovulation are stressed. At present, the long-term side effects of the various drugs and hormones used to induce superovulation are unknown. It is believed by some, however, that clomiphene citrate, one of the primary drugs used to assist in the superovulation of women, "may have a long life span in a woman's body, and may cause deleterious effects in the woman's children and in a woman herself because of this."[47] In addition, superovulation is known to cause cysts, ruptured ovaries, and possibly an increased incidence of cancer.[48] Given these potential harms, some feminists argue that women should not be asked to consent to superovulation.

Consider next the potential harms for fertile women. Participants in IVF-ET programs are now often reluctant to have their surplus embryos used for research, preferring instead to have them frozen for later use in an unstimulated cycle. This means that once again scientists may have to obtain the requisite eggs for insemination and embryo research from women seeking sterilization.

In this instance, there could be exploitation if the

women undergoing elective tubal ligations or hysterectomies were not informed of the fact that excess ovarian tissue would be removed, or if they were not informed of the intended use of the excised tissue. Alternatively, there could be coercion, in this instance, should the researchers offer women excessive or unreasonable inducements, financial or otherwise, in an effort to get their consent.

Finally, looking to the future, all women risk being used as means to an end should researchers decide to transfer, rather than discard, 'IVF' human embryos that have been used for research. Presumably the reason for transferring these embryos would be to test certain hypotheses, and to verify whether certain kinds of manipulations are effective. This possibility concerns Rowland and leads her to conclude, "that the potential abuse of women's bodies is a much stronger reality than the tenuous benefits suggested through embryo experimentation."[49]

In reply to Rowland, it can be said that the concerns raised regarding the possible harmful consequences of 'IVF' human embryo research for women are, for the most part, legitimate. The conclusion reached, however, is perhaps overstated; the potential abuse of women's bodies may not be realized, whereas many of the likely benefits of the research would be to the decided advantage of women. Moreover, it is important to note that although the risk of harm, and in particular the risks of coercion and

exploitation cannot be eliminated, the likelihood of their occurrence can be significantly diminished without banning all 'IVF' human embryo research. For instance, it could be stipulated in the relevant guidelines or legislation, that prospective egg donors (women attending IVF-ET clinics or women seeking sterilization) must be provided with full information concerning the nature and objectives of the proposed embryological research. It could also be clearly stipulated that research should proceed only with the free and informed consent of the gamete donors. Similarly, specific directives could be introduced to prohibit increased super-ovulation, and so on. In these ways one might guard against the potential abuse of women.

From a feminist perspective, this response may seem to fail to recognize the fundamental problem of sexual inequality. It naively supposes that the ethical constraints proposed will be effective, despite the imbalance of power between the sexes. While it is true that embryo research may lead to the coercion and exploitation of women, it does not inevitably do so. The potential harm for women with embryological research very much depends upon what information is disclosed, how the consent is sought, and what risks are introduced. For this reason, universal condemnation of 'IVF' human embryo research as exploitative and coercive seems unfounded, particularly as there are ways and means of ensuring that the ethical constraints stipulated are not subverted. We

should also keep in mind that women themselves can be actively involved in deciding what research should be pursued, and in enforcing the relevant ethical constraints. If men cannot be trusted to control the reproductive technologies, then women should study embryology, become active in politics and law-making and thereby assert control over their reproductive powers.

A further objection to 'IVF' human embryo research is that such research will render us less sensitive to the claims of the vulnerable and the defenseless -- the very young, the aged, the seriously ill, the mentally and physically handicapped, and those whose death is imminent. It has been suggested that if destructive research is allowed on defenseless human embryos, then eventually other equally defenseless beings may be subjected to similarly invasive and destructive research.

In addressing this issue, Kass notes how the principles of justification <u>now</u> used to justify 'IVF' human embryo research <u>already</u> sanction further research developments. Current embryological research is often justified on the grounds that,

1. It is desirable to learn as much as possible about the processes of fertilization, growth, implantation, and differentiation of human embryos and about human gene expression and its control.

2. It would be desirable to acquire improved techniques for enhancing conception and implantation, for preventing conception and implantation, for the treatment of genetic and chromosomal abnomalities, etc.

3. In the end, only research using human embryos can answer these questions and provide these techniques.

4. There should be no censorship or limitation of scientific inquiry or research. 50

These principles, Kass notes, could be used to justify far more research than is currently contemplated. There are no sharp transitions in embryonic or fetal development. Consequently the principles enumerated might equally justify research on late embryos and early fetuses. This would further contribute to a cheapening of human life, and could eventually lead to research on newborns and possibly other defenseless humans.

The presumption underlying this last claim is cogently expressed by David Ozar:

> a community that values many other things over the life of a fetus [or embryo] will experience a gradual but significant lessening in the value of human life generally, so that previously unacceptable trade-offs between human life and other values will come to be accepted. 51

Another vulnerable group to consider is handicapped persons. One of the clear objectives of 'IVF' human embryo research is the diagnosis and prevention of genetic disorders. This research objective is laudable, but it potentially threatens all handicapped individuals. Already with prenatal diagnosis and abortion for fetal indication, the underlying message is that certain embryos and fetuses are intrinsically more valuable than others. With research on embryo biopsy, this message can only become clearer. The danger for the handicapped person is that this may lead

people to attribute a lesser value to those who are born disabled and survive than is attributed to able-bodied individuals. Should this happen, much suffering might be visited upon disabled persons as others eventually come to perceive them as 'mistakes' who should not exist.[52]

Research on defenseless human beings and intolerance vis-a-vis handicapped persons are certainly not desirable consequences of 'IVF' human embryo research. But neither are they inevitable nor insurmountable. For example, it would be possible to guard against any slide towards indiscriminate research on all defenseless humans by imposing (and enforcing) strict limits on the time frame during which 'IVF' human embryo research could be undertaken. That is, one could preclude widespread research on all defenseless human beings by adding to the commonly articulated principles of justification a restrictive principle that would limit such justification to certain developmental stages. Second, one might guard against discrimination towards handicapped persons by clearly stating how and why our valuation of defective embryonic life differs from our valuation of handicapped children and adults. One crucial distinction is that the handicapped child or adult "already holds a place ... in a network of human emotions and expectations."[53]

The last of the consequentialist objections to embryological research are those that recount haunting stories of our Brave New World -- a world in which self-

modification of the species is no longer a tantalizing possibility, but an onerous responsibility.

In Aldous Huxley's Brave New World,[54] state hatcheries complete with Fertilizing Room, Bottling Room, Decanting Room, and Infant Nurseries, replace the more traditional modes of human reproduction. Embryos are created and bottled in the laboratory and, periodically during their development, they are chemically manipulated and psychologically conditioned in accordance with precise government specifications:

> In one set of bottles biologically superior ova, fertilized by biologically superior sperm, were given the best possible pre-natal treatment and [are] finally decanted as Betas, Alphas and even Alpha Pluses. In another, much more numerous set of bottles, biologically inferior ova, fertilized by biologically inferior sperm, were subjected to the Bokanovsky Process (ninety-six identical twins out of a single egg) and treated pre-natally with alcohol and other protein poisons. The creatures finally decanted were almost subhuman; but they were capable of performing unskilled work. 55

To the chagrin of some and the delight of others, recent research in human genetics and neonatology seem to point us in the direction of Huxley's Brave New World. Already the in vitro fertilization of human ova is a well-established science, and the embryos created by this procedure can survive and continue to develop outside of the body undamaged for two to three days. Meanwhile, some extremely premature neonates of twenty-two and twenty-three weeks gestational age are surviving in intensive care units with few (if any) developmental abnormalities. This suggests that it may be only a matter of time before

complete ectogenesis (conception and gestation outside of the womb) is possible, in which case the mass production of humans forecast by Huxley could become a reality.

Fletcher, for his part, maintains that if human reproduction were subject to external control, it would be reasonable to screen for, and to eliminate, defective embryos. Also, chimeras or parahumans could be created to do the dangerous and demeaning jobs, while individuals with superior genotypes could be selectively reproduced by cloning. Cloning would not only prevent deterioration of the gene pool, it would also enable the creation of live genetically matched organ donors.[56]

Others who share a positive vision of the 'New World' include Singer and Wells. They enthusiastically embrace ectogenesis, full surrogacy, cloning, sex-selection, and genetic engineering. Ectogenesis is lauded as an important option for women who are either unable or unwilling to carry a child. Full surrogacy, where the host mother has no genetic link with the embryo(s) transferred to her womb, is hailed as a significant improvement over partial surrogacy, where problems can arise because the child is genetically related to the host mother.[57] Similarly, the cloning of individuals with special abilities is applauded, as is the use of cloned embryos for the purpose of organ transplantation. The only caveat in this last instance is that the harvesting must take place prior to sentience. Cloning for the purpose of gene typing is also promoted, as

is sex-selection. The latter is perceived as an effective means of controlling population growth -- couples need not have one or more girls in the process of "trying" to have a boy. Lastly, Singer and Wells condone genetic engineering as long as positive human qualities are targeted.[58]

With 'IVF' human embryo research we hold the master key to the Pandora's box of ectogenesis, gene enhancement, cloning, hybridization, and so on. The crucial question we must now consider is, Should we unlock the box? On the one hand, we could throw away the key and prohibit all embryological research; on the other hand, we could make copies of the key widely available and allow all research to proceed. Alternatively, we could exercise some control by limiting 'IVF' human embryo research to those objectives that are generally deemed to be morally acceptable. In this way, we might reap the benefits of 'IVF' human embryo research without ushering in the Brave-New-World so vividly described by Huxley.

The Benefit-Harm Ratio

We now have some understanding of the more important potential societal benefits and harms associated with 'IVF' human embryo research. The next step is to determine whether, on the whole, the possible consequences of such research are beneficial or harmful. To this end, the likelihood of both the benefits and the harms must be assessed and then compared.

Yet, which possible outcomes should count as benefits, and which should be considered harms? Consider, for example, research on the use of embryonic cells for grafting. Edwards believes that the ability to graft stem cells from embryos into adults is one of the important potential benefits of ongoing embryo research, since it promises a possible cure for a number of serious debilitating disorders. But, is this indeed a benefit? To some, the prospect of grafting embryonic cells may seem morally repugnant because the 'IVF' human embryo is used only as a means to an end, whereas it should be respected as an end in itself.

By comparison, the alleviation of infertility, the regulation of fertility, and the prevention of genetic and chromosomal disorders are less controverial potential benefits of embryological research; and, the likelihood of their occurrence is quite high: first, because these research objectives are a priority for researchers and second because the research itself is biologically possible and technologically feasible. It is, however, far more difficult to assess the likelihood of harm in these same areas of research since many of the projected harmful consequences are at the bottom of slippery slopes. 'If 'IVF' human embryo research is permitted we will start using embryos for research "relevant to clinical problems such as the diagnosis and treatment of infertility or of genetic disorders, or for the development of safe and more

effective contraceptive measures,"[59] but we will end up exploiting women, killing newborns, creating animal-human hybrids, banking human gametes and embryos for commercial purposes, etc.'

This argument against 'IVF' human embryo research can be interpreted in one of two ways. On the one hand, this argument "may be taken to mean that, once certain practices are accepted, people shall in fact go on to accept other practices as well."[60] On this interpretation, the slippery slope argument is an argument of prediction: "that A will lead to B, ... on the strength of the empirical analysis of precedent and an appraisal of the likely direction of present research."[61] Alternatively, the slippery slope argument could be interpreted to mean that,

> once a certain practice is accepted, from a logical point of view we are committed to accepting certain other practices as well, since there are no good reasons for not going on to accept the additional practices once we have taken the all-important first step. [62]

On this reading, the slippery slope argument is an argument about the logic of justification. The focus is not on predictions about 'what will probably in fact happen' but rather on 'what the principles and rules logically imply'.

Those who are sympathetic to either version of the slippery slope argument, judge the likelihood of harm from continued 'IVF' human embryo research to be extremely high. Conversely, those who reject slippery slope considerations, dismiss the likelihood of harm as insignificant. They argue, with respect to the predictive/psychological version

of the slippery slope argument, that, by definition, the predicted harmful consequences are hypothetical, and moreover that there is no precedent to suggest that if research on 'IVF' human embryos were permitted the predicted harmful consequences would ensue. As to the logical version of the slippery slope argument, it is noted that in this case the potential for harm is only of consequence if care is not taken, from the beginning, to clearly delimit morally acceptable research. The claim here is that the potential harmful consequences of embryological research can be avoided by ensuring that the principles used to justify such research do not <u>in advance</u> justify the predicted dire consequences. On this reasoning, the best protection against a slippery slope is a firm moral dividing line. To this end, a number of restrictive principles are proposed in addition to the principles of justification commonly advanced in support of 'IVF' human embryo research.

For example, to prevent the coercion and exploitation of women, it is suggested that a restrictive principle concerning the need for free and informed choice might be added to the principles of justification commonly outlined. To preclude research on more developed humans, a principle restricting research to particular stages of embryonic development might be introduced. Similarly, to avoid morally suspect embryological research, a principle limiting such research to areas of study that are of wide

social interest might be advanced. In this way, by adding some limiting principles to the justifying principles, one could minimize some of the anticipated harms of 'IVF' human embryo research and thereby possibly ensure that the anticipated harms are proportionate to the hoped-for-benefits.

To be sure, this favourable analysis of the benefit-harm ratio is subject to criticism, the first of which is that the restrictive principles could be violated and a slide down the slippery slope of human embryo experimentation thereby initiated. This objection, although valid, is, however, of limited consequence. The problem identified is primarily one of enforcement, and can be addressed effectively by increased regulation and vigilance.

From another perspective, one might criticize the favourable analysis of the benefit-harm ratio by arguing that the limiting principles chosen will always necessarily be arbitrary; consequently, any demarcation line established on the basis of such principles could be shifted with ease and the first steps taken down the slippery slope. The charge of arbitrariness raised here is a serious one. Not only would enforcement be all the more difficult if the restrictions imposed could not be justified, but also a slide to the very bottom of the slippery slope, in all likelihood, would ensue if there was no principled reason for limiting embryological research.

Given the above, the crucial issue is not whether the restrictive principles are inviolable, but whether they are justifiable. As such, the real challenge, if a favorable benefit-harm ratio is to be assured, is to identify reasonable, non-arbitrary limiting principles on the basis of which a sharp dividing line might be drawn between morally acceptable and unacceptable embryological research.

NOTES

[1]U.S., Department of Health, Education and Welfare (HEW), Ethics Advisory Board, HEW Support of Research Involving In Vitro Fertilization and Embryo Transfer 2 Vols. (Washington, D.C.: U.S. Department of Health, Education and Welfare, May 4, 1979).

[2]R.V. Short, "Human **In Vitro** Fertilization and Embryo Transfer," a paper prepared for the Ethics Advisory Board, 1978, 3-5; Luigi Mastroianni Jr., "**In Vitro** Fertilization and Embryo Transfer," a paper prepared for the Ethics Advisory Board, 1978, 5. In U.S., Department of Health, Education and Welfare (HEW), Ethics Advisory Board, Appendix: HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer.

[3]R.V. Short, "Human **In Vitro**Fertilization and Embryo Transfer," 5-6.

[4]Luigi Mastroianni Jr., "**In Vitro** Fertilization and Embryo Transfer," 5.

[5]Ibid., 5.

[6]Ibid., 5.

[7] R.V. Short, "Human **In Vitro** Fertilization and Embryo Transfer," 6-7.

[8]Robert Edwards, "The Current Clinical and Ethical Situation of Human Conception **In Vitro**," Galton Lecture of

the Eugenic Society, in Developments in Human Reproduction and their Eugenic Ethical Implications, ed. C.O. Carter (London: Academic Press, 1983), 98-99.

[9]Ibid., 110.

[10]Until quite recently it was also thought important to learn how to produce identical twins for the purpose of genetic screening (one twin could be tested for abnormalities while the other was frozen until the test .op results were available). More recently, however, Edwards and others have argued, "that it would be preferable to remove small pieces of trophoblast from human embryos, and type these few cells, rather than disaggregate cleaving embryos in order to produce twins, one of which would be used for typing." Robert Edwards, "Potential of Research on Human Embryos," in Future Aspects in Human In Vitro Fertilization, eds. W. Feichtinger and P. Kemeter (Springer: Verlag Berlin Heidelberg, 1987), 248.

[11]Robert Edwards and Jean Purdy, eds., Human Conception In Vitro (London: Academy Press, 1981), 373; quoted in John Harris, The Value of Life: An Introduction to Medical Ethics (London: Routledge & Kegan Paul, 1985), 114-15, n. 14.

[12]The first clinical trial on humans was in 1982. The findings of this research were published in 1985. See, Backlund, Erik-Olof et al., "Transplantation of Adrenal Medullary Tissue to Striatum in Parkinsonism: first clinical trials," J Neurosurg 62, no. 2 (1985): 169-73. A second trial was initiated in 1986 and its findings were

published in 1987. See, Madrozo, Ignacio et al., "Open Microsurgical Autograft of Adrenal Medulla to the Right Caudate Nucleus in Two Patients with Intractable Parkinson's Disease," N Engl J Med 316, no. 14 (1987): 831-839.

[13]P. Brundin et al., "Experimental Basis for Clinical Trials with Dopamine Neuron Grafting in Patients with Parkinson's Disease," a paper presented at the Schmitt Neurological Sciences Symposium, Rochester, N.Y., June 30 - July 3, 1987; and A. Seiger et al., "Human Fetal Catecholamine-containing Tissues Grafted Intraocularly and Intracranially to Immunocompromised Rodent Hosts," a paper presented at the Schmitt Neurological Sciences Symposium, Rochester, N.Y., June 30 - July 3, 1987. Both papers are cited by Curt Freed, "Transplantation of Fetal Substantia Nigra and Adrenal Medulla to the Caudate Nucleus in Two Patients with Parkinson's Disease," N Engl J Med (letter) 319, no. 6 (11 August 1988): 370.

[14]Robert Edwards, "Ethics of Human Conception in Vitro," in Royal Society Symposium Ethical Limits of Scientific Research (Philadelphia: The American Philosophical Society, 1986), 21.

[15]Robert Edwards, "The Current Clinical and Ethical Situation of Human Conception **In Vitro**," 99 and 104.

[16]Gordon Dunstan, "The Question of Research with Embryos and Fetuses: Discussion," in Towards an International Ethic for Research with Human Beings,

Documents from the International Summit Conference on Bioethics, ed. Judith Miller (Ottawa: Medical Research Council of Canada, 1987), 195.

[17]Robert Edwards and Patrick Steptoe, A Matter of Life: The Story of a Medical Breakthrough (London: The Anchor Press Ltd., 1980), 99-100.

[18]Robert Edwards, "Clinical Aspects of In Vitro Fertilization," in Human Embryo Research: Yes or No? ed. The Ciba Foundation (London: Tavistock Publications, 1986), 66. As noted previously, the percentages may vary somewhat from one clinic to another depending upon experience and expertise. The IVF program at University Hospital, London, Ontario reports a 10% take-home-baby rate per embryo transfer and an 8% take-home-baby rate per oocyte retrieval per couple. See Albert Yuzpe et al., "Rates and Outcome of Pregnancies Achieved in the First 4 Years of an In Vitro Fertilization Program," Can Med Ass J 140, no. 2 (January 15, 1989): 170.

[19]H.J. Tatum, and E.B. Connell-Tatum, "Barrier Contraception: A Comprehensive Overview," Fertil and Steril 36, no. 1 (July 1981): 1-12.

[20]J.R. Daling et al., "Primary Tubal Infertility in Relation to the Use of an Intrauterine Device," N Engl J Med 312, no. 15 (11 April 1985): 937-941; and D.W. Cramer et al., "Tubal Infertility and the Intrauterine Device," N Engl J Med 312, no. 15 (11 April 1985): 941-947.

[21]"Further Analyses of Mortality in Oral Contraceptive

Users." Royal College of General Practitioners' Oral Contraceptive Study. Lancet (7 March 1981): 541-546.

[22]Anne McLaren, "Why Study Early Human Development?" New Scientist (24 April 1986): 50.

[23]Karen Dawson, "In Vitro Fertilisation: Legislation and Problems of Research," Brit Med J 295, no. (7 November 1987): 1185.

[24]Ibid., 1186.

[25]Pierre Soupart, "Present and Possible Future Research In the Use of Human Embryos," in Abortion and the Status of the Fetus Philosophy & Medicine, Vol 13, eds. William Bondeson et al., (Dordrecht, Holland: Reidel Publishing Co. 1983), 100.

[26]Ibid., 98.

[27]Ibid., 98.

[28]Robert Edwards, "Ethics of Human Conception in Vitro," 20.

[29]George Annas, "The Ethics of Embryo Research: Not as Easy as it Sounds," Law, Medicine & Health Care 14, nos. 3-4 (September 1986): 139.

[30]It is commonly supposed that ethical research requires a favorable benefit-harm ratio. I would tentatively suggest, however, that all else being equal, it might be morally acceptable to proceed with research involving humans if the potential benefits and harms were presumed equal.

[31]In scientific circles it is more common to speak of a

"risk-benefit ratio" than a "benefit-harm ratio". As Levine notes, however, the terms 'risk' and 'benefit' are non-parallel constructions and for this reason I prefer the latter formulation. See, Robert J. Levine, Ethics and Regulation of Clinical Research, 2d ed., (Baltimore, Maryland: Urban and Schwarzenberg, 1986), 37.

[32]Entities without rights may be valued by right-holders and on these grounds alone they may be protected from destructive research.

[33]R.M. Hare, "An Ambiguity in Warnock," Bioethics 1, no.2, (April 1987): 176.

[34]Ian Kennedy, "Let the Law Take on The Test-Tube." Times (London) May 26, 1984.

[35]Leon R. Kass, Toward a More Natural Science: Biology and Human Affairs (New York: The Free Press, 1985), 124-125.

[36]Ibid., 125.

[37]U. S., Congress. House Committee on the Judiciary. Subcommittee on Civil and Constitutional Rights. Abortion Clinic Violence (Washington, D.C.: U.S. Government Printing Office, 1987).

[38]Robert Levine, personal communication.

[39]P. Devlin (Lord Devlin), The Enforcement of Morals (Oxford: Oxford University Press, 1965) quoted in R.M. Hare "An Ambiguity in Warnock," 176, n. 6.

[40]The use of this quotation attributed to Nostradamus was suggested to me in the following article: George Annas,

"Precatory Prediction and Mindless Mimicry: The Case of Mary O'Connor," Hastings Center Report 18, no. 6 (December 1988): 31.

[41]Virginia Held, "Coercion and Coercive Offers" in Coercion Nomos 14, eds. Roland Pennock and John Chapman (Chicago: Aldine, Atherton Inc., 1972), 50-51.

[42]Robyn Rowland, "Making Women Visible in the Embryo Experimentation Debate," Bioethics 1, no. 2 (April 1987): 180.

[43]Elizabeth Alder et al., "Attitudes of Women of Reproductive Age to **In Vitro** Fertilization and Embryo Research," J Biosoc Science 18, (1986): 155-167.

[44]Elizabeth Alder and A. A. Templeton, "Patient Reaction to IVF Treatment," Lancet, i. (1985): 168.

[45]See, A.H. Handyside et al., "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification," Lancet i. (1987): 347-349 for a recent description of research on embryo sexing.

[46]For citations to some of the literature on the preferences of parents and prospective parents regarding the gender of their offspring see the bibliography prepared by Roberta Steinbacher "Sex Preselection: From Beyond Here to Fraternity," in Beyond Domination: New Perspectives on Women and Philosophy, ed. Carol Gould (Totowa, N.J.: Littlefield, Adams, 1984). For a discussion of female infanticide throughout history see Mary Anne Warren, Gendercide: The Implications of Sex Selection (Totowa,

N.J.: Rowman and Allanheld, 1985).

[47]Renate Klein and Robyn Rowland, "Women as Test-sites For Fertility Drugs: Clomiphene Citrate and Hormonal Cocktails" Reproductive and Genetic Engineering 1, no. 3 (1988): 251. Klein and Rowland note that there is a significant structural similarity between Clomid (clomiphene citrate) and DES (Diethylstilbestrol) and they maintain that already there is evidence to suggest a correlation between the use of clomiphene and abnormalities in children (See, 258-261). Others dispute this claim.

[48]Ibid., 251-273.

[49]Robyn Rowland, "Making Women Visible in the Embryo Experimentation Debate," 188.

[50]Leon R. Kass, Toward a More Natural Science: Biology and Human Affairs, 117.

[51]David T. Ozar, "The Case Against Thawing Unused Frozen Embryos," The Hastings Center Report 15, no. 4, (August 1985): 10.

[52]Marsha Saxton, "Born and Unborn: The Implications of Reproductive Technologies for People with Disabilities," in Test-Tube Women: What Future for Motherhood? eds. Rita Arditti, Renate Klein and Shelley Minden (Boston, Mass.: Pandora Press, 1984), 298-312.

[53]Samuel Gorovitz, "From Progeny, Progress, and Primrose Paths" in Moral Problems in Medicine, 2d ed., eds. Samuel Gorovitz et al. (Englewood Cliff, N.J.: Prentice-Hall Inc., 1983), 360.

[54]Aldous Huxley, Brave New World (London: Granada Publishing Ltd., 1977)

[55]Aldous Huxley, Brave New World Revisited (London: Chatto and Windus Ltd., 1959), 27

[56]Joseph Fletcher, The Ethics of Genetic Control: Ending Reproductive Roulette (Garden City, N.Y.: Anchor Press, a division of Doubleday Books Inc., 1974), 147-187.

[57]With full surrogacy, the host mother is not genetically related to the fetus. The ovum used is that of another woman. With partial surrogacy, the host mother is also the biological mother.

[58]Peter Singer and Deane Wells, The Reproduction Revolution: New Ways of Making Babies (Oxford: Oxford University Press, 1984), 107-189.

[59]Voluntary Licensing Authority, The Third Report of the Voluntary Licensing Authority For Human In Vitro Fertilisation and Embryology, 1988 (Sussex: Sundfield and Day Ltd., 1988), 30.

[60]James Rachels, "Medical Ethics and the Rule Against Killing: Comments on Professor Hare's Paper," in Philosophical Medical Ethics: Its Nature and Significance, eds. Stuart F. Spicker and T. Engelhardt (Boston: D. Reidel Publishing, 1977), 65.

[61]Leon Kass, Toward A More Natural Science: Biology and Human Affairs, 117.

[62]James Rachels, "Medical Ethics and the Rule Against Killing," 65.

CHAPTER THREE

ETHICAL CONSTRAINTS FOR *EX UTERO* RESEARCH ON SPARE 'IVF' HUMAN EMBRYOS

Introduction

We have now examined a variety of traditional status-based arguments both for and against 'IVF' human embryo research and seen problems in each. We have also considered the potential benefits and harms of such research, and argued that, in principle, it is possible to ensure that the anticipated benefits are proportionate to the risk of harm. Questions remain, however, as to the precise circumstances under which embryological research might be morally permissible.

These questions are now examined with reference to the findings of some of the major government committees and professional societies that have studied the ethics of new reproductive technologies and determined that, within limits, 'IVF' human embryo research is morally acceptable. The more important of the proposed limiting principles for embryological research that are considered here concern 1) the objectives of the research, 2) its scientific merit, 3) the need for informed consent, and 4) the developmental stage beyond which 'IVF' human embryos must not be cultured *in vitro*.

Objectives of the Research

One of the more important ethical constraints upon research involving human subjects concerns the moral acceptability of the research objective. If the aim of the research is morally objectionable, all other ethical preconditions for research involving human subjects -- for example, scientific validity, or informed consent -- become irrelevant.

This said, most, if not all, of the reports on the ethics of embryological research constrain both its nature and scope. In some instances, care is taken to clearly identify those research objectives which are morally acceptable. Usually, these coincide with one or more of the three main areas of research noted in the previous chapter: the alleviation of infertility; the regulation of fertility; and the prevention of chromosomal and genetic disorders. For example, the Medical Research Council of the U.K. in its statement, "Research Related to Human Fertilisation and Embryology," stipulates that embryological research is ethically acceptable provided that, amongst other things,

> the aim of the research is clearly defined and directly relevant to clinical problems such as contraception or the differential diagnosis and treatment of infertility and inherited disorders. 1

The problem in specifying the legitimate objectives of 'IVF' human embryo research is that one might unwittingly limit research in unintended ways. Consequently, an alternative approach is adopted by a number of other

committees. Instead, those research objectives which are deemed unethical are identified. Of particular concern, in this regard, are cloning and trans-species fertilization. Cloning, for instance, is prohibited by the Victoria Infertility (Medical Procedure) Act[2] and condemned by both the National Health and Medical Research Council of Australia,[3] and the Australian Senate Select Committee on the Human Embryo Experimentation Bill 1985 (The Senate Select Committee)[4]. Also, the Committee of Inquiry into Human Fertilisation and Embryology (The Warnock Committee)[5] and the New South Wales Law Reform Commission[6] both conclude that the ethical acceptability of this procedure is questionable and that it should be reviewed -- in the one instance by the Statutory Licensing Authority and in the other by the Biomedical Council.

Similarly, trans-species fertilization is also prohibited by the Victoria Infertility (Medical Procedures) Act, and condemned by the Senate Select Committee as well as the New South Wales Law Reform Commission. The Warnock Committee also prohibits trans-species fertilization but allows for an exception to this prohibition when the procedure is,

> used as part of a recognised programme for alleviating infertility or in the assessment or diagnosis of subfertility ... [provided] that the development of any resultant hybrid [is] ... terminated at the two cell stage. 7

Other areas of research that are also of concern, but less uniformly so, include the testing of drugs on human

embryos, the gestation of human embryos in other species, and the genetic manipulation of human embryos. In some of the reports a general caution is sounded, in others specific prohibitions are recommended.

With the first approach, there is the risk that morally acceptable research, which is potentially of scientific and clinical importance, may inadvertently be forestalled for not having been specifically identified as morally acceptable. To be sure, failure to condone is not equivalent to prohibition, but it may nevertheless be interpreted as such. By comparison, with the second approach, unforeseen research that proves to be morally objectionable may proceed for not having been prohibited ab initio. There is, of course, nothing to preclude additions to the original list of morally unacceptable research, but said research may have begun prior to the introduction of a new prohibition. Moreover, with the first approach broad areas of research are sanctioned, whereas with the second approach, specific research aims are condemned. A problem which follows from this is that with the first approach legitimate research objectives could be pursued in illegitimate ways.

To resolve some of these difficulties, a combined approach is here proposed whereby the more valuable areas of research are identified as priorities, rather than as the only areas of research that are morally acceptable. In addition, research objectives and procedures deemed morally

unacceptable are identified and explicitly prohibited. Of course, this will not avoid the problem of unforseen morally objectionable research. To circumvent this problem, however, one could introduce some kind of licensing system to assess each and every research protocol prior its commencement (see discussion below).

Scientific Merit

The requirement of scientific merit, as has recently been argued, can be parsed into the requirements of scientific validity and scientific value:

> A study is scientifically valid provided it is designed to yield reliable information according to accepted principles of research practice, concerning the hypothesis being tested. The results of a study whose sample size is too small, or skewed, or poorly controlled, cannot be generalized toward confirmation or disconfirmation of the hypothesis, and the study is therefore invalid.
>
> A second and distinct understanding of the requirement of scientific merit focuses upon 'value' rather than (mere) 'validity.' A study may be well designed relative to its hypothesis, and therefore be scientifically valid, but nonetheless be of no value, generally because the hypothesis itself is trivial or otherwise uninteresting. 8

In exploring this distinction Freedman concludes that whereas scientific validity is a precondition for ethical research, scientific value "needs to be judged within the context of all other elements of the ethics of research [e.g., the significance of the hypothesis, the competence of the investigators, the adequacy of the research facilities, etc.], and so should not be put forth as a prior condition for separate consideration."[9] As David

Rutstein notes,

> It may be accepted as a maxim that a poorly or improperly designed study involving human subjects -- one that could not possibly yield scientific facts (that is, reproducible observations) relevant to the question under study -- is by definition unethical.... In essence, the scientific validity of a study on human beings is in itself an ethical principle. 10

Scientific value, on the other hand, is not an absolute prior threshold condition for research involving human subjects because,

> ... some deficit in value may be tolerated provided the risks that will be incurred are very remote or minor in nature. Similarly, research of potentially great importance might outweigh substantial risks that, for less momentous aims, would be intolerable. 11

Since the focus here is on the ethical preconditions of embryological research, of concern is the requirement of scientific validity according to which research involving human subjects must be sufficiently well designed as to ensure a reasonable prospect of obtaining the information sought by the means proposed. Generally this requires: 1) good research design based on prior laboratory and animal research; 2) appropriate sample size; and 3) competent investigators as well as adequate research facilities.

1. Good Research Design

The Report of the New South Wales Law Reform Commission on In Vitro Fertilization explicitly recommends, with respect to research on 'IVF' human embryos, that the Principles of the Declaration of Helsinki (as adopted by the National Health and Medical Research Council of Australia [NH & MRC]) be complied with. The first of these

principles stipulates that,

> 1. Biomedical research involving human subjects must conform to generally accepted scientific principles and should be based on adequately performed laboratory and animal experimentation and on a thorough knowledge of the scientific literature. 12

And, on the question of prior animal research it is further noted in the Report that,

> where practicable thorough research will have been carried out on animal subjects first and an estimate made of the likely benefits and rates of success of further research on human subjects. 13

Other Reports on the ethics of research involving 'IVF' human embryos do not discuss, at length, the requirement of good research design. They do, however, stipulate that research involving human embryos should comply "with all the appropriate provisions of the regulations governing research with human subjects."[14]

This suggests that no more stringent constraints need apply to research involving human embryos than already apply to research involving human subjects. The fact that many of the reports on the ethics of embryological research specifically recommend the establishment of some kind of statutory body both to approve of, and to oversee, embryological research[15] seems, however, incongruent with this presumption. In addition, some reports recommend the introduction of a licensing system whereby research licenses are to be granted to specific investigators for specific research projects (and, unauthorized research is to be a criminal offence). In the Warnock Report, for

instance, it is specified that,

> In applying for a license, an applicant would be obliged to indicate clearly the objectives of the research, and why these cannot be achieved by means that do not involve the use or generation of human embryos. The applicant should be required to indicate the approximate number of embryos to be used, the source of the embryos and the duration of the project including for how many days embryos would be maintained and how they would be disposed of at the end of that period. The application would have to indicate what records would be maintained and these would have to be available to the inspectorate so that they can be sure that the terms of the license have been observed. The licensing body should establish that the applicant possesses appropriate qualifications and experience for the work he or she wishes to undertake and that the work is supported by peer review undertaken by appropriate academic referees. 16

The introduction of these procedural requirements (i.e., an independent regulatory committee and a licensing system) suggests that perhaps a high level of scientific value will be required for research involving 'IVF' human embryos. On the other hand, perhaps these additional requirements only reflect a lack of faith in the existing system of voluntary adherence to the guidelines for research involving human subjects.

Given that only a few licensing authorities have been established and given that these regulatory agencies have limited experience, it is impossible to know whether high standards will in fact be applied. In my view, however, because we are dealing with research that is invariably intended or expected to result in the death of the research subjects, it is particularly important that any proposed research protocol be carefully scrutinized to ensure that the research truly is "sufficiently well designed to

achieve its purposes"[17] and that it occurs within a context that gives us confidence that the design proposed will in fact be implemented. Embryological research that is poorly designed wastes human resources. And, we are not here simply talking about wasted time, energy, and money, but also wasted life. For this reason, it is arguable that quite stringent guidelines are required for the scientific design and execution of research involving 'IVF' human embryos.

2) Appropriate Sample Size

In addition to being efficiently designed, embryological research should also be of adequate size. In the 1979 Report of the HEW Ethics Advisory Board -- the first major government report on the moral acceptability of research involving human embryos -- "the essential role of the biostatistician in helping to plan laboratory research with human gametes and embryos"[18] is explicity recognized. And most recently, in the Report of the New South Wales Law Reform Commission the need to determine the proper number of research subjects required for a study once again is stressed:

> Most scientific experiments require some guarantee that the sample on which the tests are to be made is of sufficient size ... The results of any experiment conducted under less than optimum conditions are not likely to be trusted. It seems important that if research on the human embryo is to be permitted, each project should be conducted under the most ideal conditions attainable. In this way ... the numbers of embryos used for the purpose should be kept to a minimum. In this way also, there will be some guarantee that those embryos used for research purposes

will not be wasted in the process (italics added). 19

Intuitively, the transference of this restriction on research involving humans, to research involving 'IVF' human embryos, seems appropriate because both types of research involve human subjects. Nevertheless, it is important to note that the rationales underlying the proposed restrictions differ significantly. The primary objective in restricting sample size for research involving humans is to protect prospective research subjects from unnecessary harm. Those who promote 'IVF' human embryo research, however, generally do not view the embryo that is available for research purposes as an entity that can be harmed by research. It is not, therefore, with the intent of minimizing the harm to the research subject that restrictions are recommended regarding the number of embryos used. Instead, these restrictions are imposed primarily to avoid the unnecessary wastage of limited human and financial resources, and in some measure to show respect for the sanctity of life:

> In research on either animal or human material one would want to use the least amount that would effectively get the results. The logic of that is based on the sanctity of life. This view has been put forward by various ethicists ... [and] it is shared by scientists: life is not to be squandered pointlessly. [20]

Respect for the sanctity of life also imposes two other ethical constraints on life-threatening research. The first is that under no circumstances should this type of research be repeated, unless for some reason the findings require

substantiation. The second is that the information sought must not be obtainable in other ways (e.g., laboratory research, or non-life-threatening research). Moreover, respect for the sanctity of life strongly recommends collaborative research in order to avoid the duplication of work that is already underway. In addition, perhaps a national (or international) registry of who is working on which problem(s) could be created to minimize the duplication of research work.[21]

3) Qualifications of Researchers and Appropriateness of Research Facilities

Another requisite of ethical research involving human subjects is that the researchers be competent and that adequate research facilities be available both for the research subject(s) (e.g. hospital beds, requisite nursing staff, etc.) and for the researcher(s) (e.g. appropriate laboratory facilities and equipment). To be sure, similar constraints have been advocated for research involving 'IVF' human embryos, the only difference being that in this instance the facilities for the subject(s) and the researcher(s) are one and the same.

The guidelines for laboratory facilities prepared by the Voluntary Licensing Authority[22] are cited here for purposes of illustration:

> (14) The following general considerations must be taken into account when establishing laboratory facilities where in vitro fertilisation is carried out:
>
> (a) each centre must have access to an ethical committee...,

> (b) detailed records must be kept and should be readily available for examination by duly authorised staff,
>
> (c) laboratory staff must have appropriate experience and training in the techniques being used,
>
> (d) laboratory conditions must be of a high standard (e.g. good culture facilities, facilities for microscopic examination, appropriate incubators and training in 'non touch' techniques),
>
> (e) where gametes and pre-embryos are cultured and stored there must be a very high standard of security and of record keeping and labelling. 23

These guidelines are uncontroversial, and no doubt similar guidelines would be advocated and adopted by other committees with a mandate to review, on an ongoing basis, specific research projects involving 'IVF' human embryos.

A question that remains unanswered, however, is whether more stringent standards should be applied to research on 'IVF' human embryos than is usually applied to research involving human subjects. For instance, might there not be higher levels of competence demanded of investigators doing research on human embryos than is required for investigators whose research only involves the taking of blood samples? Since we are moving into uncharted waters and because such research currently entails (either directly or indirectly) the death of the research subjects, surely this question should be answered in the affirmative.

Informed Consent

As Robert Levine rightly notes, "the primary purpose of

informed consent is to be responsive to (to uphold and embody) the ethical principle of respect for persons."[24] The principle of respect for persons stipulates that persons may not be used as means to an end, but must be respected as ends in themselves. This principle requires that we treat individuals capable of self-determination as autonomous agents. For this reason, researchers are morally obliged to request and to obtain the informed consent of prospective autonomous research subjects, prior to initiating research involving these individuals.

In addition, the principle of respect for persons may require that we offer protection to those with diminished or negligible capacity for self-determination. On this point, Levine writes:

> Clearly, not every human is capable of self-determination. The capacity for self-determination matures during a person's life; some lose this capacity partially or completely owing to illness or mental disability or in situations that severely restrict liberty, such as prisons. Respect for the immature or the incapacitated may require one to offer protection to them as they mature or while they are incapacitated. 25

This explains the obligation imposed upon researchers to request and to obtain the informed consent of parents or legal guardians of individuals with diminished or no autonomy, prior to involving these individuals in any research project.

As with the other ethical constraints imposed upon research involving human subjects, the requirement of informed consent also applies to research involving 'IVF'

human embryos. There is, however, a problem in transposing this particular requirement. On the one hand, the 'IVF' human embryo clearly is not an autonomous individual, and on the other hand, there is debate as to whether the 'IVF' human embryo qualifies as a being entitled to protection.

For these reasons, in trying to determine who should decide the fate of spare 'IVF' human embryos, some have discussed the question of consent to embryological research as though the central issue was one of ownership. The American Fertility Society in its "Ethical Statement on In Vitro Fertilization" expressly stipulates that, "[i]t is understood that the gametes and concepti are the property of the donors (italics added)."[26] Edwards, for his part, maintains that,

> When we do research on embryos or observe embryos we ask our patients for permission to do research ... By asking them to consent, we make the assumption that the embryos belong to the adults (italics added). 27

Consider also the following excerpt from the National Health and Medical Research Council of Australia:

> Sperm and ova produced for IVF should be considered to belong to the respective donors. The wishes of the donors regarding the use, storage and ultimate disposal of the sperm and ova and resultant embryos should be ascertained and as far as is possible respected by the institution (italics added). 28

The assumption that the 'IVF' human embryo "'belongs' to its [genetic] parents, as a sort of chattel, and is their sole property"[29] is problematic. Notwithstanding a recent case in California (Moore v. Regents of the U. of California, et al.,)[30] there is a common law

presumption against the ascription of property rights over human bodies, organs, or tissues. To be sure, there are exceptions to this presumption, (e.g. legislative enactments regarding the donation of human organs and tissues), but as the embryo is not amongst these, nor is it analogous to these, the common law presumption against property rights in the human body presumably would apply to the 'IVF' human embryo.

An alternative to the property model is the guardianship model, which supposes that upon fertilization the property rights of the gamete donors are exhausted and the resulting embryo properly becomes the subject of guardianship. This is the approach adopted by a number of the inquiries completed to date, according to which the consent of the gamete donors must be obtained before any research involving 'IVF' human embryos may proceed. The Waller Committee writes most eloquently on this point:

> The Committee does not regard the couple whose embryo is stored as owning or having dominion over that embryo. It considers that those concepts should not be imported into and have no place in a consideration of issues which focus on an individual and genetically unique human entity. ... The Committee nevertheless does consider that the couple whose gametes are used to form the embryo in the context of an IVF programme should be recognized as having rights which are in some ways analogous to those recognized in parents of a child after its birth. The Committee does not consider that those rights are absolute just as the rights of parents are limited by the rights and interests of the child, and by the larger concerns of the community in which they all live. 31

Given the widely accepted principle that humans (and human parts) are not property, it may be said that the

guardianship model better captures certain intuitions as to how one should treat early 'IVF' human embryos. This alternative model, however, is also inappropriate because the relationship between parents (or legal guardians) and children is disanalogous to the relationship between gamete donors and resultant 'IVF' human embryos.

In this regard, the Waller Committee correctly notes that, "the rights of parents [or legal guardians] are limited by the rights and interests of the child."[32] By comparison, the 'IVF' human embryos available for research are deemed, by the investigators and the donors, not to have rights or interests. Consequently, the decision making of the gamete donors with respect to the use or disposal of their embryos is not circumscribed in the same way as the decision making of parents or legal guardians vis-a-vis their children. To explain this more clearly, the consent (or refusal) of a parent or legal guardian on behalf of a child is generally supposed to coincide with the child's best interests (or wishes, when applicable). And, when this is not possible, as with non-therapeutic research, the rule is that parents or legal guardians "should not do anything 'clearly against the interests' of the child."[33] With respect to the use or disposal of spare 'IVF' human embryos that have been targeted for research, no such constraints are thought to apply.

An alternative model, which I suggest, is that of trusteeship. With this model no ownership rights are

conferred upon the gamete donors and no status claims are made on behalf of spare 'IVF' human embryos. Simply, the persons who should be responsible for decisions regarding the use or disposal of spare 'IVF' human embryos are the persons who have donated the genetic material from which the embryos have been created.

This model is immune to the objections raised against the ownership and the guardianship models. A possibly contentious issue, however, is the choice of the gamete donors as trustees. Why not, for instance, nominate as trustees the couple for whom the embryos were originally created?[34]

Clearly, when the gamete donors and the prospective social parents are the same people the issue raised above is irrelevant. When donated genetic material is used, however, who should determine the use or disposal of any spare 'IVF' human embryos created?

In my view, if only one set of gametes is donated -- ova or sperm -- then the decision regarding the use or disposal of spare 'IVF' human embryos properly remains with those who have provided the genetic material from which the embryos were created. Suppose, for instance, that donated sperm was used to create embryos for therapeutic purposes. On this account, research could only be done on any resulting spare embryos if: 1) the sperm donor had given prior consent to the use of his genetic material for research as well as therapeutic purposes; and if 2) the

female partner of the couple for whom the embryos were created consented to research upon the spare embryos. The consent of the male partner would not be required, nor would he have power of veto over any decision made by the female partner. Neither marriage, nor a 'stable relationship' confers upon one rights over another's reproductive cells.

On the other hand, when both sets of gametes are donated, or alternatively the embryos themselves are donated, the question of consent to research upon any spare embryos is somewhat more complicated. In these instances, consent to research should still be obtained from the gamete donors, but the couple for whom the embryos were created, or alternatively the couple who have received the donated embryos, should have power of veto over the use of spare 'IVF' human embryos for research purposes, if they would prefer to have these embryos frozen for their later therapeutic use. The concern here is to avoid a situation where a physician/researcher unilaterally decides that excess embryos are his/her 'property' and that as they were donated for research as well as therapeutic purposes that it is his/her perogative to now use them for research.

For this reason, if genetic material (sperm, ova, or embryos) is donated for both therapeutic and research purposes and a decision is made to use the gametes or embryos for therapeutic purposes, then the couple to whom the donated genetic material is given can require the

continued therapeutic use of the material for their benefit. The assumption underlying this contention is that in the therapeutic context there is an implicit promise made by the physician/research qua physician to act in the patient's interest. A subsequent decision on the part of the physician/researcher qua researcher to use the embryos for research purposes would amount to a broken promise and a breach of trust unless specific other arrangements were agreed to at the outset.

The next point of contention on the question of consent to research involving spare 'IVF' human embryos concerns the use of embryos in storage when one or both partners die. The Warnock Committee recommends that if one member of the couple dies, the responsibility for the use or disposal of the 'IVF' human embryos in storage should be transferred to the partner. If there is no survivor, then the statutory licensing authority should decide how the embryos are to be used or disposed of.[35] By comparison, the Waller Committee stipulates that the couple consenting to IVF therapy and to the storage of their 'IVF' human embryos should decide in advance how their embryos are to be used or disposed of in the event of death. These prior directives are to be incorporated in the consent document and they are to be respected by the storage facility.[36] To this recommendation the following is added as a precautionary measure:

In any case where by mischance or for any other reason,

> an embryo is stored which cannot be transferred as planned, and no agreed provision has been made at the time of storage ... the embryo shall be removed from storage (italics removed). 37

Whereas the Warnock Committee recommends that the storage facility determine the use or disposal of orphaned 'IVF' human embryos. the Waller Committee limits the facility's authority to the disposal of such embryos in the absence of prior directives.

Given that embryological research is morally controversial and that gamete donors may have objections either to research in general or to specific research projects, the recommendations of the Waller Committee are, generally speaking, preferable to those of the Warnock Committee. We commonly respect the wishes of dead persons (which is why people write wills), and there would seem to be no reason in this instance to violate this practice. This is particularly so if one accepts the claim that individuals have a moral interest in ensuring that their genetic material is not misused (see discussion below). If there are no expressed wishes, however, one could follow the recommendation of the Warnock Committee and allow the storage facility to determine the use or disposal of the orphaned embryos.

In addition to these pragmatic considerations, there are other issues of concern with respect to consent. These derive from the fact that normally a valid consent should be free and informed.

At the present time there is disagreement amongst

researchers as to exactly how much information need be disclosed. On the one hand, there are those who believe that the gamete donors (or the prospective social parents) need only understand that they are being asked to consent to research involving human embryos. In describing current practice at the Bourn Hall Clinic Edwards notes,

> When we do research on embryos or observe embryos we ask our patients for permission to do research but we do not specify the nature of the research. I am not sure whether the patients can give informed consent to detailed proposals. 38

Others, however, prefer the recommendation of the Ethics Advisory Board of the United States Department of Health, Education and Welfare (HEW), (now HHS), according to which human gametes used for research involving in vitro fertilization should be obtained,

> exclusively from persons who have been informed of the nature and purpose of the research in which such materials will be used and have specifically consented to such use (italics added). 39

The reason for insisting that the gamete donors be informed of the specific aims of the research projects for which they are asked to donate their spare 'IVF' human embryos is presumably to ensure that their consent or refusal is truly informed. People who are favourably disposed towards some forms of embryological research may find specific research objectives morally objectionable and might prefer not to have their embryos used to further these objectives. For instance, one might wish to promote research on improved oral contraceptives, but prefer not to further research on

chemical abortifacients.

From this it follows that it would be ethically unacceptable to solicit or accept semen, ova or embryo donations without requesting (and obtaining) consent for the therapeutic and/or specific research use of the tissue. To be sure, gamete and embryo donors do not retain any property interests in their reproductive cells or resulting embryos. They do, however, have a moral interest in ensuring that their genetic material is not misused, i.e. is not used to further research objectives that, on one's personal value system, are morally objectionable. The issue here is respect for the sensitivities of the gamete donors.

A similar view regarding the donation of genetic material for research purposes is taken by the Medical Research Council of the United Kingdom:

> Informed consent to research involving human ova and sperm should be obtained in every case from the donor, and sperm from sperm banks should not be used unless collected and preserved specifically for a research purpose. 40

For this recommendation to be consistent with the position outlined above, only two small changes would be required: the reasoning would have to be extended to apply to ova and embryo donation, and it would have to be specified that the specific aims of the proposed research had been explained to the gamete or embryo donors.

Providing gamete and embryo donors with adequate information when soliciting their consent to embryological

research also requires explaining to prospective donors receiving infertility treatment that in all likelihood the research undertaken will not provide them with any direct benefit. For the physician/researcher to suggest otherwise might be for him/her to engage in deception.

This brings us to consider briefly another crucial element of ethically valid consent -- voluntariness. As noted previously, couples seeking infertility treatment are a vulnerable group (Cf. Chapter Two). They are dependent upon others for a pregnancy and may, therefore, consent to embryological research primarily out of fear of displeasing the physician/researcher. To avoid this possibility the National Consultative Ethics Committee in France suggests that the therapeutic and research teams be independent.[41] The problem with this suggestion is that it would be impractical to implement. IVF-ET therapy, as currently practiced, includes embryological research as an integral component. Thus, any distinction drawn now between the research and therapeutic teams would be fictitious.

The problem of undue influence is a serious one, but if the risk is recognized, then efforts can be made 1) to ensure that access to treatment in no way depends upon consent to embryological research, and 2) to communicate this fact to the participants. As a final remark, perhaps the most effective way of reducing the risk of undue influence would be for participants to always have the option of freezing their embryos for later transfer. To

be sure, it is conceivable that an IVF-ET clinic might choose not to provide cryo-preservation services because couples might choose this option instead of donating their embryos for research purposes.

A Developmental Limit on Culturing 'IVF' Human Embryos Ex Utero

As noted previously, embryological research is fundamentally different from research involving humans, because very often the research is intended or expected to result in the death of the research subjects. This difference explains the interest in limiting research involving human embryos to a particular developmental stage in order to preclude life-threatening research on fetuses, newborns, children and adults. Ideally, the limit chosen should effectively balance the moral claims of the developing 'IVF' human embryo and those of medical science.

One of the fundamental objections to embryological research is that it is incompatible with the proper respect due the embryo. The proponents of this research maintain, however, that although the embryo is due profound respect (by virtue of its origin and its potential), it is not deserving of absolute (unconditional) protection from the moment of conception onward. For example, the HEW Ethics Advisory Board in its 1979 report, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer, stipulates that,

the human embryo is entitled to profound respect; but

> this respect does not necessarily compass the full legal moral rights attributed to persons. 42

Similarly, the Warnock Committee, in its final report, notes that the human embryo should be afforded some protection in law, but not necessarily "the same status as a living child or an adult."[43]

Despite agreement on this fundamental point amongst those who favour embryological research, there is disagreement concerning both the appropriate level of respect due the very early human embryo, and the critical point in the developmental process at which the embryo's moral standing is sufficient to preclude its use for research purposes. The first of these disagreements fuels the debate regarding the moral acceptability of creating 'IVF' human embryos expressly for research purposes. The second concerns not the origin of the embryos, but rather the point beyond which embryological research should be forbidden.

One of the more conservative proposals for 'IVF' human embryo research is outlined in the Report of the Working Group on In Vitro Fertilisation Genome Analysis and Gene Therapy of the Federal Republic of Germany (The Benda Commission).[44] In this Report it is argued, on the basis of the Kantian principle that a human life should never be used solely as a means to an end, that the creation of human embryos solely for research purposes should be prohibited. It is further argued that research on spare 'IVF' human embryos should be forbidden unless it is

therapeutic in nature, or likely to result in "specific medical findings of great value." In each of these instances, research may be undertaken, but only during the first cell divisions.

On the one hand, a fundamental respect for human life explains the Benda Commission's decision to prohibit most embryological research. On the other hand, an unwillingness to forfeit the potential benefits of such research explains the limited exception to the broad prohibition. But what explains the presumption that it is only during the first cell divisions that the respect due the early 'IVF' human embryo may be overridden by the potential medical benefits of embryological research? Could not the principle of "benefit to others" equally justify research up to the beginning of implantation, or perhaps even some slightly later point in the developmental process?

No justification of the specific developmental limit chosen is provided in the Report prepared by the Benda Commission. This is a serious omission. If there is nothing morally crucial about the first cell divisions, as opposed to some slightly later point in the developmental process, then the principle justifying the exception to the broad prohibition -- benefit to others -- would equally justify research beyond this particular stage of development.

A somewhat less conservative moral demarcation line for

research involving spare 'IVF' human embryos is proposed by the National Consultative Ethics Committee in France. In its Report on Research Involving Human Embryos In Vitro and Their Use for Medical and Scientific Purposes,[45] the Committee suggests that 'IVF' human embryo research should only be conducted on spare embryos and that generally such research should not proceed beyond the point at which, under natural conditions, implantation begins.

Unlike many other committees, the National Consultative Ethics Committee argues that the adoption of a fixed moral dividing line for research involving 'IVF' human embryos is inappropriate. According to Committee members, limiting research in this way suggests that prior to some fixed time the 'IVF' human embryo is not a potential being worthy of respect, but simply disposable research 'material'. For this reason, the Committee insists that all proposals for research involving 'IVF' human embryos be evaluated on an individual basis, bearing in mind the fact that from conception onward the 'IVF' human embryo is entitled to profound respect. During the early developmental stages this respect may be overridden by the anticipated benefits of specific research projects, but it may not be denied.

On this reasoning Committee members suggest that, generally speaking, embryological research should not proceed beyond the beginning of the implantation stage -- around seven days post-fertilization. However, this limit is proposed as a general guideline to the time during which

'IVF' human embryos may be cultured in vitro (rather than as a fixed limit).

As with the recommendation of the Benda Commission, little justification is offered by the National Consultative Ethics Committee for the limit chosen. In fact, no argument is provided in defense of the proposal for limiting embryological research to the beginning of implantation. There is only a general caution to the effect that the medical objectives of the proposed research should be carefully weighed against the respect due the embryo in determining the moral acceptability of 'IVF' human embryo research.

From a developmental perspective, around seven days post-fertilization differentiation is usually complete, and at that point it is possible to distinguish the embryo proper from the extra-embryonic tissue. Could this be the reason for advocating a 'seven-day' limit for embryological research? Possibly, but this is unlikely since there is no mention of differentiation in the French Report. Moreover, if there were mention of this biological phenomenon is it unclear how its moral significance might be defended. In any event, in the Report there is only mention of the fact that seven days coincides with the beginning of implantation. Since there is no intention to transfer the manipulated embryos, however, it is difficult to explain why moral significance should be attributed to this stage of development.

The next proposed demarcation line along the continuum stipulates that 'IVF' human embryo research should not proceed beyond the stage of development normally associated with the completion of implantation. In its 1979 Report, the HEW Ethics Advisory Board concludes that,

> ... it is acceptable from an ethical standpoint to undertake research involving human In Vitro fertilization and embryo transfer provided that:
>
> A. If the research involves human in vitro fertilization without embryo transfer, the following conditions are satisfied: ...
>
> ... 4. No embryos will be sustained in vitro beyond the stage normally associated with the completion of implantation (14 days after fertilization). 46

A first problem with the limit for 'IVF' human embryo research proposed by the HEW Ethics Advisory Board concerns the choice of fourteen days as a moral dividing line. When this limit was first proposed as an objective criterion to which researchers could refer, it was widely believed that in vivo and in vitro development were synchronous. Recent studies in embryology, however, suggest that although the development of 'IVF' and in vivo human embryos is roughly equivalent up until about seven days after fertilization, there is no equivalence beyond this point.[47] It is estimated, for example, that a nine-day 'IVF' human embryo is probably only equivalent to a seven or eight-day in vivo embryo.[48]

This scientific conclusion regarding early human development suggests that the fourteen-day limit may in

fact be premature (even assuming that this limit excludes time when development is halted by freezing). If embryological research is to be permitted up until the point at which the 'IVF' human embryo acquires moral status, and if moral status is acquired at the stage of development associated with the completion of implantation, then there is no reason to limit embryological research to the first fourteen days after fertilization. The 'IVF' human embryo is not sufficiently developed by this time to have reached the developmental stage at which it is to be afforded protection from invasive and destructive research.

This disparity between the chronological and the developmental age of 'IVF' human embryos is not, however, a conclusive objection to the recommendation put forth by the HEW Ethics Advisory Board. One might simply change the proposed time limit so that it corresponds more closely with the time required for the 'IVF' human embryo to reach the same developmental stage of the <u>in vivo</u> embryo at the time when implantation is complete. Alternatively, given the different developmental rates of individual embryos and the possibility of cleavage arrest, one might rely strictly on a developmental criterion for determining morally acceptable research and choose not to express this in chronological terms.

A second objection to the moral demarcation line proposed by the HEW Ethics Advisory Board focusses not on the number of days during which embryological research

should be permitted, but on the moral significance attributed to the completion of implantation.

According to Ramsey, there is nothing morally crucial about this particular developmental stage. In his critique of the HEW recommendation for 'IVF' human embryo research he writes,

> The ... stipulation that 'no embryos will be sustained in vitro beyond the stage normally associated with the completion of implantation (14 days after fertilization)' is very odd. These are embryos to be used as research subjects. Yet the line drawn upon their usefulness, before which anything can be done with them, is <u>implantation</u> for which they are not intended. The arbitrariness of this stipulation is clear 49

Ramsey maintains that the decision to prohibit 'IVF' human embryo research beyond the completion of implantation is arbitrary, when the intention is not to implant these embryos. This is a serious accusation, because if there is no principled reason(s) for limiting embryological research to this stage of development, then the line drawn at fourteen days risks being shifted as the demands of science increase. After all, "one can always un-stipulate a mere stipulation."[50] With obvious sarcasm, Ramsey adds,

> [i]f it is right to use them [embryos] as mere means in research <u>before</u> 14 days have passed, it is right to use them <u>after</u> 14 days. A society stupid enough to place such a limit will soon recover its wits and extend the time to encompass the acquirement of additional medical knowledge. 51

While it is true that in the HEW Report no reasons are given for the proposed fourteen-day limit,[52] arguments for the moral significance of the completion of implantation can be found in the written submissions to the HEW Ethics

Advisory Board and in the relevant literature. Because other governmental committees and professional societies have since recommended, on the basis of these arguments, that embryological research be allowed up to but not beyond the stage of development normally associated with the completion of implantation, these arguments are considered next.

Those who believe that the completion of implantation is an important marker event in embryonic development generally maintain that the determinant of moral status is 'individuality', and that this criterion of moral standing is not established until implantation is complete. In support of this claim two biological facts are commonly cited: 1) the high rate of natural loss prior to implantation; and 2) the possibility of twinning and recombination prior to this developmental stage.

In commenting on the first of these biological phenomena, Kass notes that,

> ... the natural occurrence of embryo and fetal loss and wastage does not necessarily or automatically justify all deliberate, humanly caused destruction of fetal life. For example, the natural loss of embryos in early pregnancy cannot itself be a warrant for deliberately aborting them or for invasively experimenting upon them <u>in vitro</u>, any more than stillbirths could be a justification for newborn infanticide. There are many things that happen naturally that we ought not do deliberately. 53

Contrary to what Kass suggests, not everyone who points to the high rate of embryo loss prior to the completion of implantation means to suggest that because nature is

wasteful, we may be wasteful also. Consider the following argument by Dunstan:

> ... millions of sperms lost from every man, hundreds of thousands of eggs from every women [sic], all are wasted -- like acorns, and beech mast, and pollen, and frog spawn and thistle-down. The medical interventions with which we deal arrest this wastage, to some degree. ... they gain precious knowledge from cells doomed in the natural process to die. It is to be observed that my argument is not that because nature is prodigal, we may be prodigal; that because nature wastes biological life, we need not care about human life. My argument is precisely the reverse. It is that medical science imposes a measure of economy on nature's prodigality. It is within this economy that some embryos are lost (italics added). 54

This debate aside, why should the increased probability of survival until term, that is associated with the completion of implantation, signal the onset of individuality?

Also subject to criticism is the claim that individuality coincides with the completion of implantation because thereafter twinning and chimera formation do not occur. From a scientific perspective, the problem with this claim is three-fold. First, twinning can occur once implantation is complete resulting in conjoined twins (Siamese twins, or foetus-in-foetu).[55] Second, there is no scientific evidence to suggest that recombination does not occur after the completion of implantation.[56] Third, as noted previously, it is possible that there is a genetic factor in segmentation, and that from the moment of conception the number of individuals there are going to be is determined. These three factors, at the very least, raise important questions concerning the adequacy of the claim that individuality is resolved with the completion of

implantation. In addition, from a non-scientific perspective, why should the possibility of twinnning and recombination diminish moral standing as long as there will be at least one individual?

In sum, the recommendation of the HEW Ethics Advisory Board that "embryos ... [not] be sustained in vitro beyond the stage normally associated with the completion of implantation (14 days after fertilization)" is flawed on several counts. First, there is the inappropriateness of the fourteen-day limit. As noted above, this time limit fails to coincide with the developmental stage usually associated with the completion of implantation in vitro because of the discrepancy between the chronological and developmental age of the 'IVF' human embryo. Second, there is the failure of the HEW Ethics Advisory Board to provide any argument in support of the claim that moral significance should be attached to the completion of implantation.[57] And third, if we assume that the underlying morally relevant criterion is individuality, the claim that a determinate individual only exists once implantation is complete is controversial.

The next moral demarcation line for 'IVF' human embryo research moves us along the developmental continuum from the completion of implantation to the formation of the primitive streak that "appears as a heaping-up of cells at one end of the embryonic disc."[58] In 1984, a majority of the members of the Warnock Committee determined that the

formation of the primitive streak, approximately fifteen days after fertilization, marked the onset of individuality. Accordingly, at this time, the 'IVF' human embryo acquired moral standing sufficient to warrant its protection from invasive and destructive research:

> One reference point in the development of human individuality is the formation of the primitive streak. Most authorities put this at about fifteen days after fertilisation. This marks the beginning of individual development of the embryo .... We have therefore regarded an earlier date than this as a desirable end-point for research. We accordingly recommend that no live human embryo derived from in vitro fertilization, whether frozen or unfrozen, may be kept alive, if not transferred to a woman, beyond fourteen days after fertilisation, nor may it be used as a research subject beyond fourteen days after fertilisation. 59

For reasons of clarity and enforceability, members of the Warnock Committee set the limit for 'IVF' human embryo research in terms of days, not in terms of a stage of development.[60] For reasons of caution, they chose a fourteen-day limit explicitly excluding "any time during which the embryo may have been frozen."[61]

In the same year, a majority of the members of the Waller Committee concurred, for many of the same reasons, that 'IVF' human embryo research should be prohibited beyond fourteen days after fertilization. The Report on the Disposition of Embryos Produced by In Vitro Fertilization stipulates that,

> ... the use of any embryo for research shall be immediate, and in an approved and current project in which the embryo shall not be allowed to develop beyond the stage of implantation, which is completed 14 days after fertilization. It is after this stage that the primitive streak is formed, and differentiation of the

embryo is clearly evident. 62

In many respects the argument for limiting 'IVF' human embryo research on the basis of primitive-streak formation mirrors the argument for limiting such research to the stage of development normally associated with the completion of implantation. Thus, not surprisingly, many of the criticisms of the fourteen-day limit proposed by the HEW Ethics Advisory Board apply with equal force to the fourteen-day limit proposed by the Warnock and the Waller Committees.

Consider, for instance, the argument concerning the inappropriateness of the fourteen-day time-line (i.e., the discrepancy between the chronological and the developmental age of the 'IVF' human embryo). Certainly this objection would apply to both the Warnock and the Waller Reports. Recall also the failure of the HEW Ethics Advisory Board to provide a principled justification for choosing the completion of implantation as a moral demarcation line. A similar criticism could be levelled against the Waller Report. For although a reason is suggested for the fourteen-day limit (viz., that this time-line precedes the appearance of the primitive streak), there is no explanation as to the moral relevance of primitive-streak formation. In fact, it is only in the Warnock Report that one finds a reference to the moral criterion of individuality. It is explicitly stated in this Report that the formation of the primitive streak "marks

the beginning of individual development of the embryo."

Intuitively this claim seems plausible. With the primitive streak there is an identifiable marker of embryonic organization and differentiation. As noted previously, however, there is a problem with this claim owing to the fact that twinning and recombination can occur after the primitive streak has begun to form, and owing to the possibility that individuality may already be established at conception and that what is lacking is an adequate test. The first objection suggests that irreversible individuality is not determined until some time later in the developmental process. Conversely, the second objection suggests that perhaps individuality is established prior to the time at which 'observable' splitting and recombination occurs.

In addition to the debate concerning the definitive moment at which irreversible individuality is established, there is now a limited debate that specifically concerns the moral relevance of indivisibility. Lockwood, in his critique of the Warnock Report, expressly rejects the argument that persons are indivisible and that pre-fifteen-day embryos are therefore, by virtue of their divisibility, not persons.[63] Lockwood points to the 'split brain' experiments of Sperry and others in which the corpus callosum of several individuals was severed, revealing that distinct streams of consciousness are associated with each of the brain's hemispheres.[64] He finds it "perverse, in

the face of these [experiments], to maintain that human beings are essentially indivisible."[65]

These many criticisms of the moral significance of primitive-streak formation raise a further question as to why this developmental stage, more than any other, should determine moral standing. Members of the Warnock Committee explicitly recognize the continuous nature of embryonic development:

> There is no particular part of the developmental process that is more important than another; all are part of a continuous process, and unless each stage takes place normally, at the correct time, and in the correct sequences, further development will cease. Thus biologically there is no single identifiable stage in the development of the embryo beyond which the in vitro embryo should not be kept alive. 66

They insist, however, that this is "an area in which some precise decision must be taken, in order to allay public anxiety."[67] Clearly, if 'IVF' human embryo research is to be permitted, some reasonable, non-arbitrary line must be drawn between morally acceptable and unacceptable research -- not simply to assuage public concern, but also to avoid the slippery slope of embryo experimentation. It does not follow, however, that the line drawn need correspond to the formation of the primitive-streak.

For instance, one might think that 'IVF' human embryos which are used as research subjects "should not be allowed to develop beyond the stage of early neural development (Day 17 after conception)."[68] This is the recommendation of both the Royal College of Obstetricians and Gynaecologists of the United Kingdom[69] and the Medical

Research Council of Canada.[70] Alternatively, one might suggest that embryological research be permitted up until twenty-five,[71] twenty-eight,[72] forty,[73] or fifty-six days post-fertilization,[74] and perhaps longer still.[75] To each of these possible demarcation lines, however, modified versions of the criticisms already offered would apply.

There are no sharp transitions in embryonic development, no biological discontinuities. There <u>are</u> a number of discrete stages of development, such as fertilization, the beginning of implantation, the completion of implantation, the appearance of the primitive streak, the formation of the neural groove, the beginnings of the central nervous system, organogenesis, pain (i.e., nociceptive activity), and viability. As yet, however, no convincing argument has been provided that marks any one of these biological events as anything other than a significant step in what is essentially a continuous developmental process. This suggests that, despite the emerging consensus around a fourteen-day limit,[76] an alternative approach to the question of 'IVF' human embryo research is in order.

To be sure, the frequency with which this particular demarcation line is chosen may prove to be of both psychological and practical import. For example, if most committees are recommending a fourteen-day limit, other commitees, that have yet to study the ethics of 'IVF' human embryo research, may follow the established precedent and

advocate a similar limit. Also, if this limit is seen to be consistently advocated by the various supporters of embryological research, then it is perhaps more likely to be observed by the scientists subject to the research guidelines. It does not follow from this, however, that the emerging "fourteen-day consensus" is of moral relevance. Consensus in and of itself is not morally authoritative. To argue that a moral conviction is true on the basis that the majority believe it to be so is to commit the fallacy of consensus gentium.[77] The majority may be mistaken in their moral beliefs.

Therapeutic Versus Non-therapeutic Research

Given the continuity of development after insemination, some have sought to develop an alternative approach to the regulation of 'IVF' human embryo research. This alternative draws upon the familiar distinction between therapeutic and non-therapeutic research as outlined in the Declaration of Helsinki.[78]

The Australian Senate Select Committee, "not persuaded of the inherent ethical validity" of implantation as a marker event[79] chose to distinguish between morally acceptable and unacceptable research on the basis of the distinction between therapeutic and non-therapeutic research:

> The Committee intends to observe the distinction, based on the Helsinki Declaration, between experimentation of diagnostic and/or curative value and experimentation with no such value but undertaken to advance medical

> scientific knowledge. The former it will term 'therapeutic experimentation'. The latter it will term 'non-therapeutic experimentation' with the further distinction 'destructive non-therapeutic experimentation' indicating that such experiments are, in the present state of knowledge, so invasive as to inevitably cause the destruction of the subject of the experiment. 80

Next, in deference to the embryo's orientation towards the future, the Senate Select Committee argued that therapeutic 'IVF' human embryo research might be permitted but that non-therapeutic research should be prohibited:

> If, as is the view of the Committee, the embryo may be properly described as genetically new human life organised as a distinct entity oriented towards further development, then the stance and behaviour proper to adopt towards it would include not frustrating a process which commands respect because its thrust is towards the further development of a biologically individuated member of the human species ...
>
> ... The Committee concludes that the respect due to the embryo from the process of fertilization onwards requires its protection from destructive non-therapeutic experimentation. 81

A similar view is also adopted by the Congregation for the Doctrine of the Faith in its Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation (The Catholic Instruction).[82] Following the teaching of the Magisterium as to the absolute value of human life from conception onwards, the Congregation affirms the belief that, "[t]he human being must be respected -- as a person -- from the very first instance of his existence."[83] On this reasoning,

> If the embryos are living, whether viable or not, they must be respected just like any other human person; experimentation on embryos which is not directly therapeutic is illict. ...In the case of experimentation that is clearly therapeutic, namely

> when it is a matter of experimental forms of therapy used for the benefit of the embryo itself in a final attempt to save its life, and in the absence of other reliable forms of therapy, recourse to drugs or procedures not yet fully tested can be licit. 84

For some, the distinction between therapeutic and non-therapeutic research, is persuasive. Others, however, are unhappy with this distinction. They maintain that therapy and research are fundamentally distinct practices, owing to differences in primary intent that entail differences "in the nature of planning, and in the relation of the physician or investigator to the patient or subject."[85] In research the primary objective is generalizable knowledge. In therapy, on the other hand, the primary objective is to meet the needs of the patient, to further his/her interests. These are not commensurate objectives, and accordingly the phrase 'therapeutic research' carries an internal contradiction.

Those who reject the therapeutic/non-therapeutic distinction would obviously also reject the approach to 'IVF' human embryo research adopted by the Australian Senate Select Committee and the Congregation for the Doctrine of the Faith. Any distinction between morally acceptable and unacceptable research based exclusively on the therapeutic/non-therapeutic distinction would be unreliable in principle.

Alternatively, critics of the therapeutic/non-therapeutic moral demarcation line might question the presumption underlying the appeal to the therapeutic/non-

therapeutic distinction -- namely, that the embryo is a being with full moral standing from conception onwards. For instance, one might argue against the empirical claim that with the completion of the fertilization process there is a genetically unique human "oriented towards further development." Consider, for example, those embryos that become developmentally arrested and eventually die early in the pregnancy due to "errors in meiosis [i.e. maturation] in the male and female [germ cells] and errors of fertilization, such as failure to block polyspermy:"[86]

> Studies on the chromosome complements in spontaneous abortions in women have provided information on when embryos die. Some types, such as tetraploidy (karyotype: 92), trisomy C, and trisomy E, are, on average, lethal a few weeks earlier than other types, such as monosomy X, triploidy, trisomy D, and trisomy G. Nevertheless, nearly all of them become developmentally arrested by the 8th week of pregnancy. [87]

Alternatively, what about those embryos that never even begin to develop, such as the hydatidiform mole? This chromosomal abnormality is not only lethal for the embryo but possibly also for the pregnant woman. "An 'empty egg' that has lost its maternal chromosomal haploid set is fertilized by an apparently normal spermatozoon carrying a 23,X set of chromosomes."[88] The embryo created (invariably diploid and XX), "fails to develop at all, while the placenta continues to grow as a cystic grape-like structure."[89] The treatment is evacuation; rarely, this mole is found to have progressed to a choriocarcinoma, carrying with is a five to ten percent mortality rate.[90]

In addition to questioning the accuracy of the claim that all embryos are "oriented towards further development," one might further question the merits of the normative claim that moral relevance should be attached either to the formation of a unique genetic constitution or to the potential (or lack thereof) for the 'IVF' human embryo to become an adult member of the species.

As these last objections clearly point out, in the end the 'alternative approach' is simply an argument for conception as an authoritative biological demarcation line. As such, with this argument we come full circle to face once again those who maintain that although the 'IVF' human embryo is deserving of profound respect from the moment of conception onward (by virtue of its origin and its potential), it is not deserving of full moral standing.

In sum, the crucial problem here is that although an effective argument can be made for permitting limited 'IVF' human embryo research, there is no convincing argument as to the proper limit to be imposed upon such research in order to preclude the slide down the slippery slope of embryo experimentation. This inability to identify, and defend the appropriateness of, an authoritative moral demarcation line for 'IVF' human embryo research ultimately undermines the consequentialist arguments in support of such research. If there is no firm limit on embryological research, then on consequentialist grounds (i.e. slippery slope considerations) the research must be prohibited. For

'IVF' human embryo research to be permitted, therefore, some reasonable, non-arbitrary limiting principle, that effectively balances the moral claims of the 'IVF' human embryo on the one hand and medical science on the other, must be found.

NOTES

[1]Medical Research Council, "Research Related to Human Fertilisation and Embryology," Brit Med J 285 (20 November 1982): 1480.

[2]Infertility (Medical Procedures) Act 1984, No. 10163 including amendements up to Act No. 49/1988 (Melbourne: F.D. Atkinson Government Printer, 1984).

[3]National Health and Medical Research Council, Statement on Human Experimentation and Supplementary Notes, Supplementary note 4 (Australia: National Health and Medical Research Council, 1982).

[4]Senate Select Committee on The Human Embryo Experimentation Bill 1985, Human Embryo Experimentation in Australia (Canberra: Australian Government Publishing Service, 1986).

[5]Department of Health and Social Security, Report of the Committee of Inquiry into Human Fertilisation and Embryology (London: Her Majesty's Stationery Office, July 1984), in Mary Warnock, A Question of Life (Oxford: Basil Blackwell, 1985). All page references are to the book by Mary Warnock, chairperson of the Committee.

[6]New South Wales Law Reform Commission, In Vitro Fertilization Report LRC 58 (Sydney: New South Wales Law Reform Commission, 1988).

[7]Mary Warnock, A Question of Life, 71. The reason for this exception is that at the time a male subfertility test was already in use that relied on trans-species fertilization. The test involved exposing specially treated hamster eggs to human sperm to gain information on penetration capacity and chromosome complement.

[8]Benjamin Freedman, "Scientific Value and Validity as Ethical Requirements for Research: A Proposed Explication," IRB 9, no. 6 (November/December 1987): 7.

[9]Ibid., 10.

[10]David Rutstein, "The Ethical Design of Human Experiments," in Experimentation with Human Subjects, ed. Paul Freund (New York: George Braziller Inc., 1969), 384.

[11]Benjamin Freedman, "Scientific Value and Validity as Ethical Requirements for Research," 8.

[12]World Medical Association, Declaration of Helsinki Recommendations Guiding Medical Doctors in Biomedical Research Involving Human Subjects. (Adopted, Helsinki, Finland, 1964; revised, Tokyo, Japan, 1975; and Venice, Italy, 1983). Reprinted in Contemporary Issues in Bioethics, eds. Tom Beauchamp and LeRoy Walters, (Encino, California: Dickenson Publishing Co., Inc., 1978), 405-407.

[13]New South Wales Law Reform Commission, In Vitro Fertilization, 75-76.

[14]Department of Health, Education and Welfare Ethics Advisory Board, HEW Support of Research Involving Human In

Vitro Fertilization and Embryo Transfer 2 Vols. (Washington, D.C.: U.S. Department of Health, Education and Welfare, May 4, 1979), 106.

[15]In the United States, the Regulations of the Department of Health and Human Services (DHHS) stipulate that all research involving IVF must be reviewed by, and receive approval from, the Ethics Advisory Board. In Victoria (Australia), following the recommendation of the Waller Committee, all research on human embryos must be regularly scrutinised by the Standing Review and Advisory Committee. In the United Kingdom, a Voluntary Licensing Authority has been established to regulate embryological research and infertility services "as an interim arrangement until the Government introduces a statutory licensing scheme" following the recommendations of the Warnock Committee (29). And most recently, the New South Wales Law Reform Commission has recommended the creation of a Biomedical Council "to approve or disapprove of all research projects [involving 'IVF' human ebryos] proposed by holders of research licences." (55) See also, the Report of the Ontario Law Reform Commission, 209; and the Senate Select Committee Report, 54.

[16]Mary Warnock, A Question of Life, 78.

[17]Robert Levine, Ethics and Regulation of Clinical Research, 2d ed. (Baltimore: Urban & Schwarzenberg, 1986), 20.

[18]Department of Health, Education and Welfare Ethics Advisory Board, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer, 25.

[19]New South Wales Law Reform Commission, In Vitro Fertilization, 81-82.

[20]The Ciba Foundation, Human Embryo Research: Yes or No? (London: Tavistock Publications, 1986), 138.

[21]Robert Levine, personal communication.

[22]The Voluntary Licensing Authority is a body jointly sponsored by the Medical Research Council and the Royal College of Obstetricians and Gynaecologists of the United Kingdom. It was established in 1985 in anticipation of the government acting on the recommendation of the Warnock Committee that a statutory licensing authority be established to regulate research and clinical IVF.

[23]Voluntary Licensing Authority, The Third Report of the Voluntary Licensing Authority for Human In Vitro Fertilisation and Embryology, 1988 (Sussex: Sumfield and Day Ltd, 1988), 32.

[24]Robert Levine, "Informed Consent in Research and Practice: Similarities and Differences," Arch Intern Med 143 (June 1983): 1229.

[25]Robert Levine, Ethics and Regulation of Clinical Research, 16.

[26]American Fertility Society,"Ethical Statement on In Vitro Fertilization," Fertil and Steril 41, no. 1 (January 1984):12.

[27]The Ciba Foundation, Human Embryo Research: Yes or No? 141 (See comments by Robert Edwards).

[28]National Health and Medical Research Council, Statement on Human Experimentation and Supplementary Notes, 15.

[29]Robert Edwards and M. Puxon, "Parental Consent Over Embryos," Nature 310, no. 5974 (19 July 1984): 179.

[30]Moore v. Regents of the U. of California et al., (Cal. Ct. App., 2d Dist., Div. 4, 1988).

[31]The Committee to Consider the Social, Ethical and Legal Issues Arising from in Vitro Fertilization, Report on the Disposition of Embryos Produced by In Vitro Fertilization, 27.

[32]Ibid., 27.

[33]Gerald Dworkin, "Law and Medical Experimentation: Of Embryos, Children and Others with Limited Legal Capacity," Monash University Law Review 13, no. 4 (December, 1987): 202.

[34]Mary Warnock, A Question of Life, 67.

[35]Ibid., 83.

[36]The Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization, Report on the Disposition of Embryos Produced by In Vitro Fertilization, 32.

[37]Ibid., 32.

[38]The Ciba Foundation, Human Embryo Experimentation: Yes or No? 141.

[39]Department of Health, Education and Welfare Ethics Advisory Board, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer, 107.

[40]Medical Research Council, "Research Related to Human Fertilisation and Embryology," 1430.

[41]Comite Consultatif National d'Ethique pour les Sciences de la Vie et de la Sante, Avis relatif aux recherches sur les embryons humains in vitro et a leur utilisation a des fins medicales et scientifiques (Paris: Le Comite, December 15, 1986), 17.

[42]Department of Health, Education and Welfare Ethics Advisory Board, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer, 101.

[43]Mary Warnock, A Question of Life, 63.

[44]Minister for Research and Technology and Justice Minister, Working Group, In Vitro Fertilization, Genome Analysis, and Gene Therapy (Bonn: Minister, November 1985).

[45]Comite Consultatif National d'Ethique, Avis relatif aux recherches sur les embryons humain in vitro et a leur utilisation a des fins medicales et scientifiques.

[46]Department of Health, Education and Welfare Ethics Advisory Board, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer, 106-107.

[47]Karen Dawson, "Segmentation and Moral Status In Vivo and In Vitro: A Scientific Perspective," Bioethics 2, no. 1, (January, 1988): 11.

[48]The Ciba Foundation, Human Embryo Research: Yes or

No? 80.

[49]Paul Ramsey, "Gruesome Futures," in The Question of In Vitro Fertilization: Studies in Medicine, Law and Ethics Jerome Lejeune, Paul Ramsey, and Gerard Wright (London: The SPCU Educational Trust, 1984), 44.

[50]Paul Ramsey, "The Issues Facing Mankind," in The Question of In Vitro Fertilization: Studies in Medicine, Law and Ethics, 23.

[51]Paul Ramsey, "Gruesome Futures," 44.

[52]According to Mendeloff, the Ethics Advisory Board's refusal to discuss the ethical basis of its recommendations "can be recognized as the typical response of policymakers everywhere: 'muddling through'" (82). For an interesting discussion of the politics of bioethical commissions and, in particular, the politics of the Ethics Advisory Board see John Mendeloff, "Politics and Bioethical Commissions: 'Muddling Through' and the 'Slippery Slope'," Journal of Health Politics, Policy and Law 10, no. 1 (Spring 1985): 81-92.

[53]Leon Kass, Toward a More Natural Science (New York: Free Press, 1985), 107.

[54]Gordon Dunstan, "Ethical Problems Raised by the New Techniques in Human Procreation," paper presented to the Academy of the Kingdom of Morocco (Session II, November 27-29, 1986): 4.

[55]Siamese twins are identical twins that are attached to each other. They may share skin, major limbs, and/or

vital organs. "The rarest and most extreme manifestation of conjoined twins is known as foetus-in-foetu; the parasitic twin exists within the more perfect twin, usually in the chest or abdominal cavity." Karen Dawson, "Segmentation and Moral Status In Vivo and In Vitro: A Scientific Perspective," 7-8.

[56]Ibid., 7.

[57]When the HEW Ethics Advisory Board examined the moral acceptability of 'IVF' human embryo research, already in place were specific guidelines for research on fetuses from the time of implantation. It is thus interesting to speculate as to whether a desire for consistency might have been an unconscious determinant in choosing a fourteen-day limit for 'IVF' human embryo research. In the final Report of the HEW Ethics Advisory Board it is allowed that, if research with early embryos were to involve embryo transfer and subsequent implantation, the current HEW regulations governing fetal research would apply, since the 'fetus' is defined as the embryo 'from the time of implantation.'[70] See, the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, Research on the Fetus: Report and Recommendations (Washington, D.C.: Department of Health Education and Welfare, 1975). The guidelines proposed by the National Commission were adopted as federal regulation in 1975.

[58]Mary Warnock, A Question of Life, 59.

[59]Ibid., 66.

[60]Ibid., xv.

[61]Ibid., 66.

[62]The Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization, Report on the Disposition of Embryos Produced by In Vitro Fertilization, 47.

[63]Michael Lockwood, "The Warnock Report: A Philosophical Appraisal," in Moral Dilemmas in Modern Medicine, ed. Michael Lockwood (Oxford: Oxford University Press, 1985), 161. The equivocation between person and human being is inherent in the text.

[64]R.W. Sperry, "Hemisphere Deconnection and Unity in Conscious Awareness," American Psychologist, XIII (1968): 723-733.

[65]Ibid., 161-162.

[66]Mary Warnock, A Question of Life, 65.

[67]Ibid., 65.

[68]Royal College of Obstetricians and Gynaecologists, Report of the RCOG Ethics Committee on In Vitro Fertilisation and Embryo Replacement or Transfer (London: Chameleon Press Limited, 1983), 14.

[69]Ibid., 14.

[70]Medical Research Council, Guidelines on Research Involving Human Subjects 1987 (Ottawa: Medical Research Council of Canada, 1987). The guidelines for embryo research recommended by the Medical Research Council of

Canada stipulate that only "embryos up to a stage of development of no more than 14 to 17 days" (35) may be used for research purposes. Logically this implies that research may proceed up to seventeen days post-fertilization. This recommendation is more generous than that proposed by the Ontario Law Reform Commission and the Society of Obstetricians and Gynaecologists of Canada. The former endorses the recommendation of the Warnock Committee, and the latter affirms the need for embryological research prior to the implantation stage.

[71]"Helsinki Statement on Human **in Vitro** Fertilization" Ann NY Acad Sci 442, (1985): 571-572.

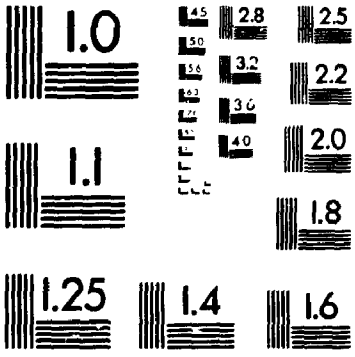
[72]Peter Singer and Helga Kuhse, "The Ethics of Embryo Research," Law, Medicine and Health Care 14, nos. 3-4 (September, 1986): 137.

[73]G. de Wert cited in J. Cohen and Robert Edwards, "Responses to Nine Questions Concerning Research on Human Embryos," Human Reproduction 1, no. 4 (1986): 265.

[74]Ismail Kola, (Research Fellow of the Centre for Early Human Development, Monash University, Melbourne, Australia), personal communication.

[75]J. Testart asserts that "the time limit [for research on human embryos] should be the same as that set for legal abortion" cited in J. Cohen and Robert Edwards, "Responses to Nine Questions Concerning Research on Human Embryos," 265.

[76]A recent international study of the major committee


1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8

statements on the ethics of new reproductive technologies, prepared by LeRoy Walters, confirms the emergence of a general consensus regarding the appropriateness of a fourteen day limit for 'IVF' human embryo research. See for example, reports from the American HEW Ethics Advisory Board, the Victorian Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization (Australia), the Council for Science and Society (U.K.), the Committee of Inquiry into Human Fertilisation and Embryology (U.K.), the Ontario Law Reform Commission, Spain's Special Commission for the Study of Human In Vitro Fertilization and Artificial Insemination, the American Fertility Society, Western Australia's Committee to Enquire into the Social, Legal and Ethical Issues Relating to In Vitro Fertilization and Its Supervision, and the Dutch Health Council's Committee on In Vitro Fertilization and Artificial Insemination by Donor. For bibliographic information see LeRoy Walters, "Ethics and New Reproductive Technologies: An International Review of Committee Statements," The Hastings Center Report (Supplement) 17, no. 3 (June 1987): 3-9.

[77]Peter Angeles, Dictionary of Philosophy (New York: Barnes and Noble Books, 1981), 97.

[78]World Medical Association Declaration of Helsinki.

[79]Senate Select Committee on the Human Embryo Experimentation Bill 1985, Human Embryo Experimentation in Australia, 29.

[80]Ibid., 17.

[81]Ibid., 25 and 29.

[82]Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day (Vatican City: The Congregation, 1987).

[83]Ibid., 12.

[84]Ibid., 16-17.

[85]Francis Rolleston and James Miller, "Therapy or Research: A Need for Precision" IRB 3, no.7 (Aug./Sept. 1981): 2.

[86]Pierre Soupart, "Present and Possible Future Research in the Use of Human Embryos," in Abortion and the Status of the Fetus, Philosophy and Medicine Vol. 13, eds. William Bondeson et al. (Dordrecht, Holland: D. Reidel Publishing 1983), 81.

[87]Ibid., 81.

[88]Aron Szulman, "Complete Hydatidiform Mole: Clinicopathologic Feature," in Gestational Trophoblastic Disease, eds. Aron Szulman and Herbert Buchsbaum (New York: Springer-Verlag, 1987), 31.

[89]Pierre Soupart, "Present and Possible Future Research in the Use of Human Embryos," 95.

[90]William Ober, "Choriocarcinoma: Historical Notes," in Gestational Trophoblastic Diseaes, eds. Aron Szulman and Herbert Buchsbaum (New York: Springer-Verlag, 1987), 7.

CHAPTER FOUR

AN ALTERNATIVE APPROACH TO EX UTERO RESEARCH ON SPARE 'IVF' HUMAN EMBRYOS

Introduction

As evidenced by the discussion in Chapter One, there is, in philosophy and theology, a well-established tradition of grading protection for developing human life in accordance with morphological development.[1] The present effort to limit morally acceptable 'IVF' human embryo research to a particular developmental stage fits within this tradition. However, as we have seen in the previous chapter, this approach to the regulation of embryological research is problematic because it fails to accommodate our current understanding of the facts concerning the development of the early human embryo. Embryonic development is a continuous process, and "there is no particular part of [this] process that is more important than another."[2] At odds with this fact of early human development is the ongoing effort to identify some biological discontinuity in the developmental process to which moral significance might legitimately be attached.

This apparent contradiction, which causes some "to exaggerate the extent of what science can say, or to overlook parts of it,"[3] conceivably arises because those

who support embryological research 1) recognize the need to limit this research in order to avoid the slippery slope of embryo experimentation, and 2) believe that the only appropriate and enforceable limit is one that corresponds to a particular developmental stage. It is avowed that "about the best protection one can have against a slippery slope is ... an enforced limit with a clear point that almost everyone is capable of appreciating [and accepting]."[4] Commonly the limit chosen for 'IVF' human embryo research is a particular developmental stage and then the corresponding time limit is advocated as the limit beyond which no embryological research may be undertaken. To avoid the real danger of the slippery slope, however, a convincing reason for drawing the moral dividing line at the point specified must be defended. If the proposed limit is perceived as arbitrary, there will always be arguments for shifting the demarcation line and this could precipitate a slide down the slippery slope.

The proposed developmental limits for embryological research examined in Chapter Three are uniformly subject to the charge of arbitrariness. To avoid this charge, and thereby avoid sliding down the slippery slope of embryo experimentation, it is here argued that the focus should not be on some particular developmental feature of the human embryo, but rather on the embryo's potential for development tout court.

In this chapter, the moral relevance of the difference

between human embryos that have the potential for continued human growth and development and human embryos that do not have this potential is explored. To this end, a distinction between viable and non-viable 'IVF' human emmbryos is introduced and possible methods of diagnosing embryo viability are described. This is followed by a discussion of what is morally wrong with killing to show that none of the concerns associated with the act of killing apply to the destruction of non-viable 'IVF' human embryos. On this basis, it is argued that scientifically and ethically sound research on non-viable 'IVF' human embryos may proceed.

Embryological Viability

Interpreted literally, 'viability' means "ability to live." A more accurate statement of the concept, however, would be "ability to live under certain conditions," because all viability claims rest on certain background assumptions regarding intrinsic developmental properties of the entity in question (e.g., developmental maturity, state of health, etc.), extrinsic facts of environment and technology, as well as other considerations such as human choices (concerning, for example, the provision of the above), and survival time. For this reason, a particular entity may be considered viable by some, non-viable by others, depending upon how these boundary conditions are specified.

Generally speaking, with developing human life, of

concern is the ability to live *in utero* or *ex utero*, with or without technological assistance (i.e., medical technology that is *in principle* available (*Cf.* Chapter One, n. 53)), for a minimum period of time. With reference to this last condition, it is here stipulated that in order to be considered viable, the early human embryo would have to be capable of continued growth and development (under some given circumstances) until such time as a viable infant may come into being. It follows that, given available medical technology, at the present time, for an embryo to qualify as viable it would have to be capable of surviving for (at a minimum) approximately twenty to twenty-two weeks (the time frame noted here refers to gestational age). Significantly, however, as we become technologically more capable this requisite survival time could diminish in which case it might be necessary to designate some arbitrary minimal survival period. Otherwise, viability would become synonymous with 'living'.

Given a constant survival time, the remaining conditions for embryological viability can be encompassed in the following definitions:

1) ability to live *in utero* without technological assistance;
2) ability to live *in utero* with technological assistance;
3) ability to live *ex utero* without technological assistance; and
4) ability to live *ex utero* with technological assistance.

This is illustrated in Figure 1 on page 190.

Figure 1:

Technological Assistance / Environment	Without	With
In Utero	1. Some In Vivo	2. More In Vivo Some In Vitro
Ex Utero	3. ø	4. present ø future Some In Vivo Some In Vitro

The numbers in the boxes correspond to the four definitions of embryological viability outlined above.

The first definition of embryological viability posits that a viable human embryo is an embryo that has the ability to live in utero **without technological assistance** until such time as a viable infant may be born. Accordingly, a specific human embryo in utero normally would be considered viable provided that, all else being equal*, i) the uterine environment was non-hostile, ii) there was adequate nourishment available, and iii) the embryo was not afflicted with an imminently lethal disorder. (* e.g., there was no action taken by the pregnant woman to abort the developing human prior to the time of birth.)

With this definition, all 'IVF' human embryos would be non-viable -- including the ten to twenty percent of 'IVF' human embryos transferred that result in live births -- because, at the very least, technological assistance would be required to effectuate the transfer of the embryo to the uterus. Moreover, some in vivo embryos that currently result in live births, given available medical technology, would also be considered non-viable. Technological assistance is sometimes required by the embryo/fetus and sometimes required by the pregnant woman in order to ensure the survival of the embryo/fetus. Fetal erythroblastosis,[5] for instance, is fatal if untreated. With blood transfusions, however, the affected fetus can survive. Respiratory arrest in a pregnant asthmatic woman is not only life-threatening for the mother but also for the

embryo/fetus. If untreated, both will die. With ventilation and medication, however, there is a reasonable prospect of survival.

With the second definition of embryological viability, a viable embryo is an embryo with the ability to live **in utero with technological assistance**, if and as required, until the birth of a viable infant. In this instance, all else being equal, an in vivo human embryo would be viable provided that i) the uterine environment was non-hostile or, if hostile, that the environment could be rendered healthy and physiologically receptive, ii) there was adequate nourishment available or, if not, that appropriate nourishment could be supplied artificially, and iii) the embryo was not afflicted with an imminently lethal disorder or, if so afflicted, that the disorder could be corrected, or compensated for.

If, on the other hand, the embryo were in culture then with this definition of embryological viability, the following conditions would have to be added to those stipulated above; iv) the culture medium for fertilization and embryonic growth in vitro was non-hostile, v) the intention of the physician/researcher was to transfer the 'IVF' human embryo at an appropriate time to a healthy and physiologically receptive uterus, vi) the physician/researcher manipulating the embryo had the requisite skills to do so without fatally damaging the embryo, and vii) there was a woman willing to accept the

transfer of the embryo to her uterus.

In this view, all 'IVF' human embryos not intended for transfer would be non-viable. In addition, any *in vivo* human embryos and successfully transferred 'IVF' human embryos that could not survive *in utero*, despite all efforts to sustain life, would be non-viable.

Thirdly, embryological viability might be defined in relation to the embryo's potential for survival ***ex utero*** **without technological assistance** until such time as a viable infant might come into being. Here, by definition, all embryos would be non-viable -- including healthy embryos developing normally in receptive uterine environments. Human embryos, by virtue of their constitution, cannot survive *ex utero* without technological assistance.

Finally, embryological viability could be defined in terms of the embryo's ability to live ***ex utero*** **with technological assistance**, until such time as a viable infant might come into being. In this case, all else being equal, an embryo *ex utero* would be viable only if, i) it was technologically possible to provide the embryo/fetus with an appropriate, non-hostile environment for gestation, ii) it was technologically possible to provide the embryo/fetus with adequate nourishment, and iii) the embryo was not afflicted with an imminently lethal disorder *or*, if so afflicted, that the disorder could be corrected or compensated for. And, if the embryo were *in vivo*, a further

condition would have to be added to those already specified, viz., v) the physician/researcher had the requisite skills to remove the embryo from the uterus without fatally damaging the embryo.

At the present time, given available medical technology, human embryos can only survive ex utero for a few days.[6] With this definition of embryological viability, therefore, no embryos would qualify as viable. Looking towards the future, however, ex utero gestation (ectogenesis) might eventually be possible, in which case, presumably some embryos could meet the above conditions and qualify as viable.

In the abstract, these four definitions of embryological viability are equally plausible. In considering the purpose this concept is supposed to serve, however, the advantages and disadvantages of the proposed definitions can be assessed. Insofar as the ethics of embryological research is concerned, if viability is to serve as a moral demarcation line, then none of the definitions outlined above are satisfactory.

Consider first the claim that a viable embryo is an embryo capable of survival **in utero without technological assistance**. The implications for embryological research with this particular definition of viability are counter-intuitive inasmuch as fetuses, children, and adult members of the species who require technological assistance in order to survive are not usually considered non-viable and

on this basis used for research purposes. By parity of reasoning, embryos that require technological assistance in order to survive should not be considered non-viable and used indiscrimminately for research.

Consider next the second definition of embryological viability according to which a viable embryo is an embryo capable of survival **in utero with technological assistance.** At first glance this may seem like a plausible moral demarcation line. The problem, however, with this definition of embryological viability is that if it were used to distinguish between morally acceptable and unacceptable 'IVF' human embryo research, it would follow that research on all non-transferred embryos was morally acceptable. But why should a decision not to transfer an 'IVF' human embryo to an environment in which it could survive, in and of itself, constitute legitimate moral grounds for proceeding with research upon that embryo? With this definition of embryological viability the distinction between morally acceptable and unacceptable research would rest upon a morally irrelevant factor -- namely, the decision of the physician/researcher to proceed with embryo transfer.

Similarly, definitions of embryological viability that require **ex utero survival without technological assistance** are also problematic. In this view, all research on human embryos would be morally acceptable. But why should the embryo's inherent inability to survive ex utero justify its

use for research purposes?

Finally, embryological viability defined as survival **ex utero with technological assistance** is also unsuitable as a moral demarcation line for research involving 'IVF' human embryos. It follows, at the present time, that because of our failure to develop an artifical womb, all research on human embryos would be morally acceptable. But why should our present inability to sustain embryonic life ex utero until such time as a viable infant might come into being, make research subjects of all embryos?

Given these criticisms, any definition of embryological viability that excludes technological assistance, that turns on facts of human intention, or that, at the present time, requires ex utero survival is unsuitable as a moral demarcation line for research involving 'IVF' human embryos. As such, the definition of embryological viability that recommends itself for the purpose of 'IVF' human embryo research is a version of the second definition proposed minus any assumptions regarding the intentions of the physician/researcher concerning the transfer of the embryo, and the willingness of a woman to accept the transfer of an embryo to her uterus. Clearly, if these conditions are not met the 'IVF' human embryo will fail to develop. These conditions, however, are irrelevant as concerns the ethics of embryo research and ought not, therefore, to determine whether an embryo may or may not be used for research.

Given these qualifications, at the present time, a viable 'IVF' human embryo is an 'IVF' human embryo with a reasonable prospect of continued human growth and development **in utero with technological assistance** until such time as a viable infant may be born, given i) a non-hostile environment (in utero or in culture) or, if hostile, an environment that could be rendered healthy and physiologically receptive, ii) the normal availability of nourishment or, if not, the ability to provide the requisite nourishment, and iii) the absence of any imminently lethal disorder or, alternatively, the ability to correct any disorder with which the embryo may be afflicted. In addition, on this view, viability is not dependent upon the intentions of the physician/researcher, or the willingness of a woman to accept the transfer of an embryo. A non-viable 'IVF' human embryo, on the other hand, is an 'IVF' human embryo that is dying with no hope of reprieve. If transferred to a healthy and physiologically receptive uterus for gestation, it would either fail to implant, or would implant and then spontaneously abort. A non-viable 'IVF' human embryo, by definition, has no potential for ongoing development. Given a non-hostile environment (in utero or in culture), the normal availability of nourishment, and available medical technology it would still die.

Having defined the concept of embryological viability for the purpose of 'IVF' human embryo research, the next

logical step is to consider its ethical significance. First, however, a brief discussion of existing and future means of identifying non-viable 'IVF' human embryos is in order. It is important that one appreciate at the outset, that the distinction between viable and non-viable 'IVF' human embryos is not merely a conceptual one.

Methods for Diagnosing Embryo Quality and Viability

In theory, there are a number of ways in which to evaluate both the quality and the viability of pre-implantation 'IVF' human embryos. At present, however, only morphological criteria are used to distinguish 'IVF' human embryos that are viable from those that are non-viable. Prior to transfer, human embryos in culture are routinely examined with a light microscope to check for irregular or degenerate cells, and to assess "the stage of development of the embryo in regard to the time since fertilization."[7] On this basis, the embryos are then graded for morphological appearance. Generally those which are graded as 'poor' because of "moderate or severe fragmentation and ... gross irregularity of or granularity/darkness within blastomeres"[8] are excluded from transfer. This is done for both ethical and pragmatic reasons, since previous studies have shown that such embryos do not result in successful pregnancies.[9]

To its credit, morphological observation may be described as a quick, non-invasive viability test that

requires relatively simple equipment.[10] The problem with this test is that the morphological criteria used to assess viability (e.g., compactness, symmetry, and density) are both subjective and imprecise. Consequently, the test is unreliable except when there are major morphological defects, or when the 'IVF' human embryo is in cleavage arrest -- "a state where the [embryo] remains alive in culture but fails to undergo any further development."[11]

Given the fact that gross morphological appearance and stage of development are unreliable indicators of embryo viability, prominent scientists are now working to develop non-invasive and non-destructive biochemical tests for evaluating the quality and the viability of pre-implantation 'IVF' human embryos. This research, some of which looks at secretions released into the culture medium by the embryo,[12] and some of which measures the embryo's consumption of particular metabolites, suggests that in the near future it may be possible to accurately assess the viability of 'IVF' human embryos prior to embryo transfer. For illustrative purposes, a brief summary of a research project within each of these categories is provided below.

One significant research project that looks at the 'IVF' human embryo's secretions, involves the study of a phospolipid that, when released by the zygote, acts as a platelet activating factor. Early studies with mice undertaken by Chris O'Neill and his colleagues,[13] suggested that platelet activation was initiated by the presence of

an embryo, and so a bioassay was developed to detect and to measure embryo-derived platelet activating factor (PAF) in the culture medium of mouse embryos.[14] The ensuing research indicated a direct correlation between failure to produce PAF and failure to establish a pregnancy. Mouse embryos that did not secrete PAF consistently failed to implant in the uterus, suggesting that PAF was either directly or indirectly necessary for implantation.

This notable preliminary finding raised the possibility that PAF could be used as a marker for assessing the viability of pre-implantation 'IVF' human embryos. This possibility was later confirmed by monitoring the maternal platelet count of IVF patients after embryo transfer, and by measuring the PAF activity of 'IVF' human embryos.[15] Further studies are needed to validate this research, and in particular to elucidate the precise role of PAF in establishing a pregnancy. However, it would seem that the ability to measure PAF could provide us with a non-destructive means of identifying a certain class of non-viable 'IVF' human embryos[16] -- 'IVF' human embryos that fail to produce PAF, and hence fail to implant in the uterus.

Another research project on the viability of 'IVF' human embryos -- one that looks at patterns of consumption -- examines the embryo's uptake of pyruvate (one of the main energy sources of early 'IVF' human embryos). Initial studies by Gardner and Leese[17] on the metabolic needs of

mouse embryos indicated that pyruvate was "an essential nutrient during the first cleavage divisions"[18] but that at the 8-cell stage "the embryos underwent a switch in their metabolism ... which enabled them to use glucose predominately rather than pyruvate."[19] This phenomenon suggested that perhaps "the metabolic history of an embryo in culture [could] ... be used to predict its survival in utero."[20]

Subsequent research involving human oocytes and 'IVF' human embryos was undertaken to investigate this possibility. A pattern of pyruvate consumption similar to that of mouse embryos was observed.[21] But, more importantly, the measurements for pyruvate consumption obtained by sampling the culture medium around the oocytes and embryos, demonstrated that degenerating oocytes and embryos had significantly lower rates of pyruvate uptake than did mature oocytes and morphologically normal 'IVF' human embryos. This preliminary research finding suggested that perhaps embryo viability could be assessed on the basis of changing patterns of pyruvate uptake. Further studies are needed, however, to ensure an adequate understanding of the correlation between consumption of pyruvate and viability.

Another possible viability test for 'IVF' human embryos, suggested by Trounson and his colleagues, is the rate of cleavage. In studying the effects of delayed insemination, Trounson and co-workers noted that a higher

pregnancy rate was achieved with human embryos that divided rapidly in culture. Further study of this phenomenon could reveal an interesting correlation between embryo viability and cleavage.[22] Also, there is the possibility of a correlation between embryo viability and changes in oxygen utilization as well as carbon dioxide production.[23]

One further line of research into embryo viability, distinct from those mentioned above because the tests being developed are extremely invasive examines the chromosomal and genetic causes of non-viability. The most notable of the proposed pre-transfer genetic diagnostic techniques is embryo biopsy. With this procedure, one or two blastomeres are excised from the eight-cell 'IVF' human embryo for the purpose of analysis.[24] Meanwhile, the remainder of the embryo is frozen until the results of the cytogenetic and biochemical tests are available.[25]

Another of the proposed genetic diagnostic techniques requires the removal of small pieces of tissue during cleavage. Research on this particular prenatal diagnostic test is currently being done with mouse embryos. It has been suggested, however, that similar research could be done with human embryos. Ten to twenty cells could be excised from the mural trophoblast and used to diagnose the embryo's genotype.[26] The genetic component of embryonic loss is significant and for this reason continued research into these and other techniques for examining the genetic information encoded in the early 'IVF' human

embryos are generally considered important.[27]

To be sure, the research described above ultimately may prove to be unsuccessful. There is little doubt, however, that as we become technologically more capable, a reliable non-destructive test (or combination of tests) will be developed for assessing embryo viability. The risk then will be that such test(s) might be used for assessing embryo quality (i.e."the normality of the genetic information assembled at fertilization")[28] instead of embryo viability. To some, this may seem as though with the proposal for research on non-viable 'IVF' human embryos we are poised at the top of a slippery slope. As noted previously, however, one can prevent a slide down a slippery slope by ensuring that the principles used to justify one practice do not, in advance, justify other practices that are clearly morally objectionable.

The Moral Significance of Embryological Viability

Having introduced the distinction between viable and non-viable 'IVF' human embryos (and shown that the distinction is not merely a conceptual one), the next step is to examine the traditional reasons for protecting life to see if, from a moral point of view, it matters whether viable or non-viable 'IVF' human embryos are killed during the course of research.

From a non-consequentialist perspective, killing humans is intrinsically wrong. From a classical utilitarian perspective, on the other hand, killing is generally wrong

because it harms the killer, the family and friends of the decedent, society at large, and most importantly the decedent. This last harm is of three kinds. There is the harm caused by the fear of being killed, the harm caused by the suffering inflicted in the act of killing, and most importantly the harm that results from the loss of life.

With the killing of 'IVF' human embryos is there harm to the killer? Kass answers this question in the affirmative. His concern is with the dehumanizing effect of embryo research on the scientists' attitudes towards human life.[29] Possibly Kass would have these concerns regardless of whether viable or non-viable 'IVF' human embryos were used for research purposes. However, whereas it is conceivable that the killing of viable embryos might engender disrespect for developing human life, it is difficult to imagine how research on non-viable embryos (that have no potential for continued human growth and development) for the benefit of those living, would minimize one's respect for human life.

The second relevant harm to consider is harm to family and friends. Generally speaking, with the killing of 'IVF' human embryos no such harm is occasioned. Not only are these early human embryos not part of a social network (and so there are no friends to mourn their passing), but if the free and informed consent of the gamete donors (and, as necessary, the prospective social parents) were obtained, then presumably the "parents" would not be harmed (i.e.

grieved) by the loss.

Next, what about harm to society? A concern here is that "society is made worse by wrongdoing within it, both directly and through the weakening of the force of its moral norms."[30] Also, there is concern for the anxiety caused to those who might consequently believe themselves to be in danger. The killing of 'IVF' human embryos, and in particular the killing of non-viable 'IVF' human embryos would in these respects be of negligible importance. Other members of society would not be threatened by this type of killing since, as Devine notes, the killing of embryos is clearly "socially isolated from all other possible cases of killing."[31] And as to the prior concern -- that the killing of 'IVF' human embryos might seriously threaten the social fabric -- suffice it to say that the threat would be impotent with respect to research on non-viable 'IVF' human embryos if such research were not considered wrong in the first place. (At first glance, it may seem as though this last point begs the question given that the issue is whether the killing of embryos is morally wrong. This is unavoidable because part of the harm to society caused by the act of killing is the violation [and hence the weakening] of its moral norms. The violation of a society's norms is wrong insofar as its threatens the moral fabric of the community. If the killing of embryos were not deemed morally wrong <u>ab initio</u>, then this harm would not be realized.)

Finally, what about harm to the 'IVF' human embryo? Clearly the 'IVF' human embryo, whether viable or not, would suffer neither fear nor pain if killed, but what about the harm caused by loss of life?

To effectively address this last question, it is appropriate to step back and consider Sissela Bok's discussion of the moral acceptability of abortion. Bok specifically maintains that very early abortions are morally permissible because none of the traditional reasons for protecting life (viz., sympathy for the victims, brutalization of the killers, grief of family and friends, and loss to society) apply during the early stages of development. She writes,

> This group of cells cannot feel the anguish or pain connected with death, nor can it fear death. Its experiencing of life has not yet begun; it is not yet conscious of the interruption of life nor of the loss of anything it has come to value in life, nor is it tied by bonds of affection to others. If the abortion is desired by both parents, it will cause no grief such as that which accompanies the death of a child. Almost no human care and emotion and resources have been invested in it. Nor is such an early abortion brutalizing for the person voluntarily performing it, or a threat to other members of the society where it takes place. 32

Bok's argument is compelling in some respects, but as she notes the argument carries counter-intuitive implications if one considers, for example, the quick and painless killing of a hermit in his sleep by a person who then commits suicide. On the reasoning outlined above wouldn't this killing also be legitimate since the putative reasons for protecting life would, in this instance, also

be absent?

> Here there is no anxiety or fear of the killing on the part of the victim, no pain in dying, no mourning by family or friends ..., no awareness by others that a wrong has been done; and the possible brutalization of the murderer has been made harmless to others through his suicide. 33

To this counter-example Bok responds, "I find I cannot use words like 'deprive,' 'deny,' 'take away,' and 'harm' when it comes to the group of cells, whereas I have no difficulty in using them for the hermit."[34]

Like Bok, Philip Devine identifies four harms that derive from the act of homicide: "harms to the killer, harms to the decedent's friends, harms to the society in which the killer, decedent, and others live, and harms to the decedent."[35] Unlike Bok, however, Devine concludes that just as it is wrong to kill the hermit,

> So also the killing of an embryo might be considered murder, even though those who might mourn its death are parties to the act, though the embryo itself suffers neither fear nor pain, and though the act is socially isolated from all other possible cases of killing. 36

Devine arrives at this opposite conclusion having argued previously that,

> loss of life ... is the central harm inflicted by an act of homicide. This is a harm that can be inflicted on any organism; plants, nonhuman animals, and human organisms of every stage of development including the embryonic can all suffer loss of life. 37

Bok, on the other hand, maintains that the use of a word like 'harm' in relation to the loss of life requires, "if not a person conscious of his loss, at least someone who at a prior time has developed enough to be or have been

conscious thereof."[38]

Bok's understanding of the con ept of harm is consonant with that of Joel Feinberg's. According to Feinberg, harm, in the genuine sense, is "the thwarting, setting back, or defeating of an interest."[39] Interests, according to Feinberg, are of two kinds: welfare interests and ulterior interests. Generally, welfare interests include interests in,

> the continuance for a foreseeable interval of one's life, and the interests in one's own physical health and vigor, the integrity and normal functioning of one's body, the absence of absorbing pain and suffering or grotesque disfigurement, minimal intellectual acuity, emotional stability, the absence of groundless anxieties and resentments, [etc.]. 40

Essentially, welfare interests are the interests one has in staying alive and healthy "with minimally adequate resources."[41] Ulterior interests, on the other hand, are those interests that encompass one's life goals and aspirations. It is for the fulfillment of these interests that welfare interests are of concern.

Since both welfare and ulterior interests are made up of desires or wants, according to Feinberg, the having of interests necessarily presupposes "at least rudimentary cognitive equipment:"[42] "Without awareness, expectation, belief, desire, aim and purpose, a being can have no interests; without interests he cannot be benefitted [or harmed]."[43] Of trees Feinberg writes:

> Trees are not the sorts of beings who have their own "sakes," despite the fact that they have biological propensities. Having no conscious wants or goals of their own, trees cannot know satisfaction or

> frustration, pleasure or pain. Hence, there is no possibility of kind or cruel treatment of trees. In these morally crucial respects, trees differ from the higher species of animals. 44

This reasoning is applied wholesale to infants, fetuses, and unborn generations. These beings, according to Feinberg, also lack the requisite traits for the possession of actual interests and cannot therefore be harmed unless, of course, their potential interests become actual. On the assumption that a person will come into being, Feinberg allows that future or potential interests might be attributed to a developing fetus, but these would only take effect if and when the potential interests became actual.

This understanding of the concept of harm is rejected by Devine who argues that any living being may be harmed by the taking of its life. In particular, Devine discounts the presumption, common to Bok and Feinberg, that only conscious entities are capable of suffering loss/being harmed. Insisting on this point, Devine remarks that,

> it is possible to harm an unconscious person; indeed to harm him in such a way that he will never become aware that he has been harmed (not only by killing him, but also by reducing him to idiocy). 45

According to Devine, any living organism with the prospect of continued life can be harmed by the taking of its life, regardless of its state of consciousness.

What follows on either account as regards the killing of 'IVF' human embryos? According to Feinberg, since embryos have no desires or wants they cannot be the bearer

of interests and consequently cannot be harmed. On this reasoning, the killing of 'IVF' human embryos is morally permissible. Yet as Devine points out, living human embryos are self-maintaining biological systems. As such, they have an interest in their ongoing functioning and can, therefore, be harmed by the loss of life. This harm, according to Devine "is at least sometimes the decisive and central reason for regarding an act of killing as seriously wrong."[46] In this view, all things being equal, 'IVF' human embryos should be allowed to continue living.

There is, however, one important respect in which all things are not equal -- viz., not all 'IVF' human embryos are of equal value. Rachels writes,

> If something is (positively) valuable because it contains certain elements, and those elements are removed and are not replaced by anything equally valuable, nor is that loss compensated in any other way, then that thing is made less valuable as a result. 47

It follows that the value attributable to non-viable 'IVF' human embryos is less than that attributable to viable ones. Non-viable 'IVF' human embryos do not embody "an imminent plan"[48] that includes the ongoing functioning of the organism as a whole. By comparison, viable 'IVF' human embryos have the potential (whether intrinsic or technologically-assisted) to continue growing and developing towards humanhood or personhood.

As concerns the ethics of 'IVF' human embryo research, this difference in value between viable and non-viable 'IVF' human embryos is significant. Generally speaking, it

is the 'IVF' human embryo's potential for continued growth and development that renders its manipulation morally problematic. Of concern is the possibility that during the course of research one might alter or completely inhibit the embryo's potential. The non-viable 'IVF' human embryo, as contrasted with the viable 'IVF' human embryo, however, has no potential for ongoing development. A fortiori, its potential cannot be diminished. For this reason, non-viability goes a long way towards making 'IVF' human embryo research a much less worrisome act.

The non-viable 'IVF' human embryo is, at most, morally equivalent to other human somatic cells. What usually distinguishes the cell mass known as the human embryo from other cell masses is the embryo's potential ability to become a full-fledged member of the moral community. Without this ability, the 'IVF' human embryo is of no more value than other human body cells and therefore is deserving of no more respect and protection than other human cell clusters.

The Positive Thesis

A number of prominent experimental embryologists tell us that much of what is important in terms of the preservation and improvement of human life can only be learned from research on 'IVF' human embryos. It is here argued that if: 1) the proposed research is aimed at legitimate scientific, medical, or diagnostic objectives;

2) the research itself is scientifically worthy (e.g., prior laboratory and animal research indicates that with the proposed method and sample size there is a reasonable prospect of achieving the stated objectives); 3) the anticipated benefits are proportionate to the anticipated harms; and 4) the gamete donors (and, as necessary, the prospective social parents) voluntarily consent to the specific research objectives, then it is morally permissible to proceed with research on non-viable 'IVF' human embryos.

In sum, there is a morally relevant difference between 'IVF' human embryos that, by virtue of their specific constitution and given available medical technology, have the potential for continued human growth and development **(viable 'IVF' human embryos)**, and 'IVF' human embryos that do not have this potential **(non-viable 'IVF' human embryos)** (see discussion on p. 197). The difference is such that non-viable 'IVF' human embryos may routinely be targeted for research (regardless of their developmental stage) subject to the limitations noted previously. (This conclusion should not be taken to imply that all research on viable 'IVF' human embryos is morally unacceptable. Questions concerning the appropriate treatment of viable embryos are not here resolved; it is only argued that research on non-viable 'IVF' human embryos is morally acceptable.)

NOTES

[1]Gordon Dunstan, "The Moral Status of the Human Embryo: A Tradition Recalled," J of Med Ethics 10, no.1 (March 1984): 38-44.

[2]Mary Warnock, A Question of Life (Oxford: Basil Blackwell, 1985).

[3]Board for Social Responsibility of the General Synod of the Church of England, Personal Origins: The Report of a Working Party on Human Fertilisation and Embryology of the Board for Social Responsibility (London: CIO Publishing, 1985), 30.

[4]Michael Lockwood, "The Warnock Report: A Philosophical Appraisal," in Moral Dilemmas in Modern Medicine, ed. Michael Lockwood (Oxford: Oxford Univesrity Press, 1985), 166.

[5]Fetal erythroblastosis is a congenital disorder that "results from development in the mother of anti-Rh antibody in response to Rh factor in the (Rh-positive) fetal blood." Illustrated Stedman's Medical Dictionary, 24th ed. (London: Williams and Wilkins, 1982), 485.

[6]Robert Edwards, "Ethics of Human Conception in Vitro," in Royal Society Symposium Ethical Limits of Scientific Research (Philadelphia: The American Philosophical Society, 1986), 21; and The Ciba Foundation, Human Embryo Research:

Yes or No? (London: Tavistock Publications, 1986), 80 (see comments by Robert Edwards).

[7]J.E. Butler and J.D. Biggers, "Assessing the Viability of Preimplantation Embryos **In Vitro**," Theriogenology 31, no. 1 (January 1989): 116.

[8]John Yovich, "Embryo Quality and Pregnancy Rates in In-Vitro Fertilisation," Lancet (2 February 1985): 283-284.

[9]Ibid., 283-284.

[10]J.E. Butler and J.D. Biggers, "Assessing the Viability of Preimplantation Embryos **In Vitro**," 116.

[11]Karen Dawson, "Segmentation and Moral Status **In Vivo** and **In Vitro**: A Scientific Perspective," Bioethics 2, no. 1 (January 1988), 10.

[12]There are a number of secretions from cleaving 'IVF' human embryos that might be useful in diagnosing viability. These include: (1) early pregnancy factor; (2) macrophage-inhibiting factor; (3) leukotrienes; (4) histamine releasing factors (For all of the above see, Robert Edwards, "Diagnostic Methods for Human Gametes and Embryos," Human Reproduction 2, no. 5 (1987): 417); (5) embryo-derived platelet activating factor, (see, Chris O'Neill, and Doug Saunders "Assessment of Embryo Quality," Lancet (3 November 1984): 1035); (6) lymphocyte activating factor (see, R.G. Edwards and P. Hollands "New Advances in Human Embryology: Implications of the Preimplantation Diagnosis of Genetic Disease," Human Reproduction 3, no. 4 (1988): 550); and, (7) immunosuppressor factor(s) (see,

Salim Daya and David Clark "Production of Immunosuppressor Factor(s) by Preimplantation Human Embryos" AJRIM 11 (1986): 98-101).

[13]Chris O'Neill, "Thrombocytopenia is an Initial Maternal Response to Fertilization in the Mouse," J Reprod Fertil 73 (1985): 567-577.

[14]Chris O'Neill and Doug Saunders, "Assessment of Embryo Quality," Lancet (1984): 1035.

[15]Chris O'Neill et al., "Maternal Blood Platelet Physiology and Luteal-Phase Endocrinology as a Means of Monitoring Pre and Postimplantation Embryo Viability Following In Vitro Fertilization," J In Vitro Fertil Embryo Transfer 2, no. 2 (1985): 59-65. See also, Chris O'Neill et al., "Maternal Recognition of Pregnancy Prior to Implantation: Methods for Monitoring Embryonic Viability In Vitro and In Vivo," Ann NY Acad Sci 442 (1985): 429-439.

[16]Chris O'Neill, "Embryo-Derived Platelet Activating Factor: A Preimplantation Embryo Mediator of Maternal Recognition of Pregnancy," Domestic Animal Endocrinology 4, no. 2 (1987): 69-85.

[17]D.K. Gardner and H.J. Leese, "Non-Invasive Measurement of Nutrient Uptake by Single Cultured Pre-Implantation Mouse Embryos," Human Reproduction 1, no.1 (1980): 25-27.

[18]H.J. Leese et al., "Uptake of Pyruvate by Early Human Embryos Determined by a Non-Invasive Technique," Human Reproduction 1, no. 3 (1986): 181.

[19]D.K. Gardner and H.J. Leese, "Non-Invasive Measurement of Nutrient Uptake by Single Cultured Pre-Implantation Mouse Embryos," 25.

[20]Ibid., 27.

[21]H.J. Leese et al., "Uptake of Pyruvate by Early Human Embryos Determined by a Non-Invasive Technique," 181-182.

[22]J.E. Butler and J. D. Biggers, "Assessing the Viability of Preimplantation Embryos **In Vitro**," 117.

[23]C. Magnusson et al., "Oxygen Consumption by Human Oocytes and Blastocysts Grown **In Vitro**, Human Reproduction 1, no. 3 (1986): 183-184.

[24]An excised blastomere is capable of continued growth and development as if it were a single-cell embryo. In principle, therefore, the blastomere is entitled to the same protection as the embryo. From this it follows that initially research on embryo biopsy should be limited to embryos which have been identified as non-viable on morphological or metabolic grounds. Once the technique has been perfected, research could perhaps continue with viable embryos depending upon whether viability is to serve as an absolute demarcation line or as a preferential mechanism for promoting research on non-viable mebryos (Cf. Chapter Five, "The Probem of Foregone Knowledge").

[25]A recent study of non-destructive sexing of preimplantation human embryos using embryo biopsy is described in Lancet; see, A.H. Handyside et al., "Biopsy of Human Preimplantation Embryos and Sexing by DNA

Amplification," Lancet (February 18, 1989): 347-349.

[26]R.G. Edwards, "Diagnostic Methods for Human Gametes and Embryos," Human Reproduction 2, no. 5 (1987): 417.

[27]J.E. Butler and J.D. Biggers, "Assessing the Viability of Preimplantation Embryos In Vitro," 121.

[28]Ibid., 121.

[29]Leon Kass, Toward a More Natural Science: Biology and Human Affairs (New York: The Free Press, 1985), 58.

[30]Philip Devine, The Ethics of Homicide (Ithaca: Cornell University Press, 1978), 19.

[31]Ibid., 22.

[32]Sissela Bok, "Who Shall Count as a Human Being? A Treacherous Question in the Abortion Debate," in Abortion Pro and Con, ed. Robert, Perkins (Cambridge, Mass.: Schenkman Publishing Co., 1974), 99.

[33]Ibid., 99.

[34]Ibid., 100.

[35]Philip Devine, The Ethics of Homicide, 18.

[36]Ibid., 22.

[37]Ibid., 20-21.

[38]Sissela Bok, "Who Shall Count as a Human Being?" 100. Bok is correct in asserting that we should abandon "the quest for a definition of humanity capable of showing us who has a right to life." (98) Instead, we should directly consider what is wrong with killing and focus on the principles governing the protection of life. Unfortunately, in one crucial respect, Bok's understanding

of these principles fails to reflect an adequate appreciation for the harm to the decedent that comes from the taking of life. This not only explains why Bok is unable to clearly identify the harm occasioned by the killing of the hermit or the late fetus, that makes the taking of life in either of these instances morally objectionable, but it also explains why Bok cannot defend the killing of early human embryos without appealing to her own moral intuitions.

[39]Joel Feinberg, Harm to Others: The Moral Limits of The Criminal Law (Oxford: Oxford University Press, 1984), 33.

[40]Ibid., 37.

[41]Ibid., 59.

[42]Joel Feinberg, "The Rights of Animals and Unborn Generations," in Today's Moral Problems, 2d ed., ed. Richard Wasserstrom (New York: Macmillan Publishing, 1979), 588.

[43]Ibid., 595.

[44]Ibid., 588.

[45]Philip Devine, The Ethics of Homicide, 21.

[46]Ibid., 23.

[47]James Rachels, The End of Life: Euthanasia and Morality (Oxford: Oxford University Press, 1986), 65.

[48]This locution was suggested to me in reading, Samuel Gorovitz, "From Progeny, Progress, and Primrose Paths," in Moral Problems in Medicine, 2d ed., eds. Samuel Gorovitz,

et al. (Englewood Cliffs, New Jersey: Prentice-Hall, 1983): 355-363.

CHAPTER FIVE

OBJECTIONS TO AND MERITS OF THE POSITIVE THESIS

Introduction

A significant number of early 'IVF' human embryos are incapable of ongoing human development, given available medical technology, even if they are appropriately transferred to a healthy and physiologically receptive uterus. In the previous chapter it was proposed that these non-viable 'IVF' human embryos may morally be targeted for research.

Coincidentally, it is current practice within the scientific community for these non-viable embryos to be used for research purposes. To be sure, on occasion, normal 'IVF' human embryos created in the context of IVF-ET therapy are used for research. There are problems with this practice, however, given that in the short term research on healthy embryos is contrary to the immediate objective of IVF-ET therapy which is to establish a successful pregnancy. To meet this objective, usually all normal embryos created are either transferred or frozen for later transfer. In addition, normal 'IVF' human embryos are sometimes created expressly (and solely) for research purposes. This is also problematic, however, because of the many ethical concerns regarding the intentional creation of human research subjects. For these reasons, at

the present time, most embryological research is on embryos originally intended for transfer that are not replaced (or frozen for later replacement) because they are non-viable -- invariably, these are embryos with three or more pronuclei.[1]

At present, the proportion of non-viable 'IVF' human embryos that are commonly excluded from transfer and used de facto for research purposes is small. For example, only three to five per cent of human oocytes fertilized in vitro have three pronuclei.[2] By comparison, it is presently estimated that some thirty percent of human embryos created in vitro cannot survive because of chromosomal abnormalities.[3] Unlike the embryos with abnormal structures, these embryos cannot be identified by morphological examination. With the development of more sensitive and accurate non-destructive viability tests (or combination of tests), these embryos could be identified and targeted for research. This could lead to an increase in the number of 'IVF' human embryos that scientists might routinely set aside for research purposes.

The use of non-destructive viability tests for the purpose of identifying potential research subjects raises several important questions. Many of these are essentially consequentialist objections to the use of a non-viability criterion for research on spare 'IVF' human embryos, and they merit careful consideration.

The problem of extrapolation: From a scientific perspective would research on non-viable 'IVF' human embryos be legitimate?

One of the more serious objections to research on non-viable 'IVF' human embryos arises because the findings from such research may not apply directly to viable human embryos. Just as research on animal embryos sometimes offers limited promise, because interspecies extrapolation may not be possible (or may be misleading),[4] so too research on non-viable 'IVF' human embryos may be of limited value.

This objection to restricting 'IVF' human embryo research primarily to non-viable embryos is not persuasive. There are in fact a number of prominent and successful scientists who only use non-viable 'IVF' human embryos for their research and who maintain that useful information can be extrapolated from these embryos.[5] In discussing research on inherited diseases, Robert Williamson writes:

> Why does an extra copy of chromosome 21 give the characteristic facial feature of the Down's child, the fingerprints, the heart malformations, and the early brain changes at the age of thirty that are so reminiscent of Alzheimer's disease? Are each of these the result of the activity of a single extra gene or of several genes working together? One way to study this crucial set of questions is to examine gene expression and development of trisomic embryonic material in vitro...
>
> ... When ova are fertilized in vitro, it often happens that two sperm enter a single egg, giving a triploid embryo. Such an embryo is non-viable, and no one would reimplant it. However, it develops more or less normally in culture up to the blastocyst stage, and it seems that many questions about gene activity can be

answered with such material. 6

A similar point is made by Edwards in defending his use of tripronucleate eggs for research purposes:

> In my view the triploid embryo grows equally well as a diploid to a blastocyst ... the nuclei are abnormal in chromosome numbers but the embryos are metabolically normal. These embryos give us a great deal of information. 7

Clearly, as shown by Edwards, Williamson, and others,[8] non-viable 'IVF' human embryos are useful research material.

Moreover, research upon non-viable 'IVF' human embryos has already yielded much valuable information on embryonic development, as in the above cited work on pyruvate consumption.[9] This suggests that any objection to the experimental use of non-viable embryos on the grounds that useful information could not be extrapolated is not serious enough to challenge the potential of such research.

<u>The problem of foregone knowledge: Could all of the embryological research presently contemplated be done on non-viable 'IVF' human embryos?</u>

Another objection to the proposal in support of research on non-viable 'IVF' human embryos stems from the concern that some of the research presently contemplated might inappropriately be forestalled. Already, a number of the research projects proposed foresee the use of normal human tissue (at least during the final research stages). An example is research on the techniques of gene analysis. Initially these techniques could be developed using animal models and abnormal embryos, but for them to be applied to

humans they would eventually have be tested on normal human material. On this point, Williamson writes,

> Often triploid (pathological) material will be suitable [for research purposes] but occasionally, particularly if a finding is to be used as a starting point for clinical treatment, it may be necessary to use normal material at early stages of pregnancy. 10

Certainly some of the required research on 'normal human material' could be done on fetal tissue obtained from terminations of pregnancy. There are significant ethical problems regarding the use of this tissue for research purposes, but the "lesser of two evils" approach recommends that one consider using tissue from dead fetuses[11] before considering the destruction of living 'IVF' human embryos. What if, however, the information sought could only be obtained by research on viable embryos? Would a particular area of study then inevitably be neglected as a consequence of a proposal for research on non-viable 'IVF' human embryos?

To be sure, with this proposal, as with the various other proposals for limited embryological research, some research presently contemplated would not be sanctioned. Exactly which research would be permitted and which would be prohibited, however, depends upon whether viability is to serve as an absolute moral demarcation line, or as a preferential mechanism for promoting research on non-viable embryos.

In the first instance, no research on viable 'IVF' human embryos would be permitted. In the second instance,

research on viable embryos might proceed provided that in addition to the other ethical constraints for embryological research 1) the information sought could not be obtained by any other means (e.g., laboratory research, animal research, research on non-viable 'IVF' human embryos, and research on fetal material obtained from terminations of pregnancy), and 2) it could be shown unequivocally that the value attributed the anticipated benefits of the proposed research outweighed the value attributed the viable embryo.[12] (Here, the burden of proof would rest with those who would permit the research.)

Evidently, in either case, the embryos available for research purposes would be limited (more so in the first instance than the second) and consequently, certain areas of research might be forstalled. This fact, in and of itself, however, does not constitute grounds for criticising the proposal put forth. After all, the purpose of ethical deliberation is not to justify anything people want to do, but rather to work towards an understanding of what is morally acceptable and, accordingly, to impose certain ethical constraints.

<u>The problem of 'doctoring' dying 'IVF' human embryos: What becomes of the non-viability criterion once it is possible to manipulate dying 'IVF' human embryos so as to ensure their viability?</u>

Assume that embryologists will eventually be able to

manipulate 'IVF' human embryos that are currently non-viable so as to ensure their ongoing development towards humanhood or personhood. A further objection to the use of a non-viability criterion for research on spare 'IVF' human embryos then follows: As we become more technologically capable, this criterion might severely restrict research opportunities.[13]

It is widely anticipated that, in time, it will be possible to cure dying 'IVF' human embryos. This possibility raises at least two interesting questions: 1) Given the familiar edict that "what can be done will be done" is it appropriate to assume that the manipulation of dying 'IVF' human embryos will become routine clinical practice? and 2) Is it reasonable to posit a future moral obligation to doctor all dying 'IVF' human embryos, in which case there might be a present obligation to freeze all embryos which are currently non-viable until such time as a possible cure might be available?

In response to the first concern, suffice it to say that given the potential for harm in manipulating and transferring dying 'IVF' human embryos and given the relative ease with which inherently viable embryos can be obtained, it is unlikely that what might eventually be technically possible would be pursued at the expense of what is clinically acceptable.

By comparison, the second question is problematic because it is unclear to whom the positive obligation to

create life might be due. For instance, would this obligation be owed to dying embryos, to 'future' viable embryos, or to gamete donors?[14] The question raised here is critical insofar as the implications for 'IVF' human embryo research may differ significantly depending upon where the obligation lies.

In my view, no positive obligation to create life is owed to dying 'IVF' human embryos. Just as there is no obligation owed to human somatic cells to develop and use cloning techniques,[15] and similarly there is no obligation owed to human ova to develop and use parthenogenetic technology, so too there is no obligation owed to dying 'IVF' human embryos to develop and use genetic manipulation techniques. More generally, it is also worth noting that any obligation to avoid causing harm does not logically imply an obligation to benefit.[16] At most, the obligation not to cause harm may entail an obligation to prevent harm.

Alternatively, might the obligation to create new life by manipulating dying 'IVF' human embryos be owed to 'future' viable embryos (i.e., embryos which are currently non-viable, but could become viable as we become more technologically capable)? In my view, there is no reason to suppose such an obligation to 'future' viable embryos. This viewpoint is consistent with the beliefs of those who maintain that there is no moral obligation to reproduce. Moreover, it does not contradict the beliefs of those who do recognize such an obligation, since those who share this

belief generally do not maintain that the obligation is owed to the offspring (but rather, for example, is owed to God, to society, or to one's spouse). Admitedly, there are obligations to offspring and to viable embryos such as the obligation not to cause them unnecessary harm. These obligations do not include, however, an obligation to ensure their coming into being (whether by means of intercourse, in vitro fertilization, or the manipulation of dying embryos).

Significantly, however, such an obligation might be owed to the couple for whom the embryos were created. Embryos created in vitro in the context of an IVF-ET program are originally intended for the purpose of initiating a pregnancy. Thus, depending upon the wishes of the couple, there may be a moral obligation to use all legitimate means available to promote the welfare of dying 'IVF' human embryos (This might include an obligation to freeze dying embryos until such time as a cure may become available).[17] To prevent there being such an obligation, however, the physician/researcher need only inform the couple, at the outset, of the fact that no attempt will be made to manipulate and then transfer dying 'IVF' human embryos.[18]

Given all of the above, the future ability to doctor dying 'IVF' human embryos should have little impact on the availability of such embryos for research purposes.

The problem of adequate supply: Would it be morally acceptable to create non-viable 'IVF' human embryos intentionally for research purposes?

In addressing this issue, there are two plausible scenarios which must be distinguished: 1) the manipulation of viable 'IVF' human embryos in order to create non-viable ones; and 2) the manipulation of the progenitor gametes so as to ensure that, from the start, the embryos created in vitro are non-viable. In principle, the first option would be morally unacceptable given the prima facie obligation not to kill viable 'IVF' human embryos. This obligation, however, might be outweighed by other considerations. On occasion, therefore, it might be morally permissible to render viable embryos non-viable. From a pragmatic perspective, however, there would be little reason to follow this course of action. If the moral obligation not to kill viable embryos were overridden in the interest of a specific research project, there would be no reason to render the viable embryos non-viable, since one could proceed directly with the research.

By comparison, the moral acceptability of intentionally creating non-viable 'IVF' human embryos by manipulating the progenitor gametes is not so easily resolved. According to a recent study by Wentz et al.,[19] the percentage of 'IVF' human embryos with three or more pronuclei varies greatly depending upon the ovarian stimulant used. For instance, with clomiphene citrate stimulation the frequency of

abnormality is about two per cent, whereas with human menopausal gonadotropin (hMG) stimulation, it could be as high as twelve per cent. An obvious way to increase the number of 'IVF' human embryos available for research purposes would be to superovulate women with hMG.

To be sure, from a practical perspective this suggestion is rather outlandish. It is considered here, however, because it is important to question the moral acceptability of intentionally manipulating progenitor gametes so as to create dying embryos. For the sake of argument, then, let us assume that there are no therapeutic reasons for or against using this particular stimulant. Would it be morally acceptable to use this drug in order to obtain more non-viable 'IVF' human embryos for research purposes?

It would undoubtedly be unethical to administer hMG to any woman unless the increased abnormality rate for the embryos created had been clearly explained, and a specific informed consent for the use of this particular drug had been obtained. This said, it is conceivable that a valid consent for the use of this drug might be obtained from a woman undergoing sterilization who had consented to the donation of her gametes for research purposes. It is questionable, however, whether a valid consent for the use of this stimulant could be obtained from an infertile woman undergoing IVF-ET therapy. After all, it would be extremely odd for an infertile woman to consent to a

reduced number of viable embryos, and possibly a reduced chance of pregnancy, when the reason for undergoing superovulation in the first place is to increase the chance of successful pregnancy. For this reason alone, any consent to the use of hMG by an infertile woman seeking IVF-ET therapy should be considered suspect.

But let us assume that valid consents for the use of hMG can be obtained from infertile women as well as women seeking sterilization. Would it then be morally wrong to create 'IVF' human embryos in such a way as to ensure their non-viability?

In answering this question, it is interesting to briefly consider certain aspects of the contemporary debate regarding the use of 'spare' versus 'research' embryos. On the one hand, there are those who maintain that there is no morally relevant difference between fortuitously spare 'IVF' human embryos and embryos created ad hoc for research purposes. On the other hand, there are those who insist that the difference is so great that although research on spare 'IVF' human embryos might be permitted as the lesser of two evils, research on embryos deliberately created for this purpose could never be countenanced.

In the first camp are those who maintain that the intention with which an embryo is created does not alter its moral standing. On this point some members of the Warnock Committee argued that,

... if research on human embryos is permitted at all,

> it makes no difference whether these embryos happen to be available or were brought into existence for the sake of research ... in both cases, ... the moral status of the embryo would be the same. 20

Also in this camp are those who maintain that, in order to conduct properly controlled research and thereby to reduce the overall wastage of 'IVF' human embryos, investigators should deliberately create embryos for research purposes, instead of relying upon material available by chance:

> The results of any experiment conducted under less than optimum conditions are not likely to be trusted. It seems important that if research on the human embryo is to be permitted, each project should be conducted under the most ideal conditions attainable. In this way, and not by use of the spare embryo theory, the numbers of embryos used for the purpose should be kept to a minimum. 21

In the second camp are those who believe that embryological research can only be justified on the grounds that it would be inherently wasteful to discard that which could be used to enhance knowledge and to further humanitarian objectives. On this reasoning, clearly only research on spare 'IVF' human embryos might be justified. Also in this camp are those who are concerned about the dehumanizing effect of intentionally creating human life solely for research purposes. This practice is seen to be in direct contradiction of the fundamental principle that we may not use humans solely as means to an end, but must respect them as ends in themselves:

> From a moral perspective, it may be said that, regardless of the particular level of respect which different sections of the community would accord an embryo, this individual and genetically unique human entity may not be formed solely and from the outset to be used as a means for any other purpose, however

> laudable. Where the formation occurs in the course of an IVF procedure for the treatment of infertility, the reasons which lead to the embryo's existence are not "means to an end" ones. 22

As applied to the issue at hand -- i.e., the deliberate creation of non-viable 'IVF' human embryos -- these objections to the intentional creation of human life for research purposes lose moral force. Non-viable 'IVF' human embryos expressly created for research purposes have no capacity for continued growth and development. Research embryos, on the other hand, may have this capacity (assuming they are viable), and risk having it altered or completely inhibited if used for research purposes. As such, the arguments against the deliberate creation of research embryos do not apply to the intentional creation of non-viable 'IVF' human embryos by manipulation of the progenitor gametes. And, as I can posit no other reasons why non-viable 'IVF' human embryos should not be expressly created in this way, I conclude that the manipulation of human gametes in order to create non-viable embryos is not morally objectionable. In fact, in important respects the intentional creation of non-viable 'IVF' human embryos for research purposes is analogous to the intentional propagation of other living tissues (e.g., cancer tissue) for research purposes.

(By parity of reasoning, would it be morally acceptable to intentionally conceive a child afflicted with a disorder that would ensure its imminent and unavoidable death at birth, so that the child could then be used for invasive

and destructive research? In the most important respect, the two cases are not analogous. The intentional creation of defective cell clusters in no way compares with the intentional creation of defective beings who, on all but the most stringent accounts of humanhood or personhood, qualify as moral agents.)

The problem of slippery slopes: Does the argument provided for destructive research on non-viable 'IVF' human embryos not justify, in advance, life-threatening research on babies born dying as well as dying comatose patients?[23]

The last objection to the use of a non-viability criterion for ex utero research on spare 'IVF' human embryos considered here, suggests that by analogy it would be morally permissible to use those who are dying for research purposes. This objection is particularly serious and, if accurate, would certainly undermine the positive thesis. In my view, however, the argument for research on non-viable 'IVF' human embryos does not justify research on those who are dying.

In defense of the claim that allowing research on non-viable 'IVF' human embryos does not justify research on comatose dying patients one could argue, following Richard Wasserstrom, "that there is no analogue to the concept of nonviability in the case of the adult:"[24]

> Medical science cannot identify with confidence those cases in which an individual will die soon without regaining consciousness, in the same way in which it can identify with confidence those fetuses that are not

yet viable. 25

Contra Wasserstrom, however, it is now possible to identify with confidence some unconscious patients whose death is impending and unavoidable. This can be done using recent imaging techniques such as the CT scan, nuclear magnetic resonance (NMR), and PET scan.[26] In some instances, patients with severe brain damage confirmed by one or more of these imaging techniques can appropriately be described as non-viable.[27]

If, then, it is reasonable to describe certain patients as non-viable, what is the morally relevant difference between research on non-viable embryos and research on non-viable patients, such that the former is morally acceptable whereas the latter is not? To answer this question we need only recall the earlier discussion regarding the morality of killing. In brief, killing is wrong because it harms the decedent's family and friends, it harms the killer, it harms society and, most importantly, it harms the decedent. This last harm, as previously noted, includes the pain and suffering caused by the act of killing, the fear of being killed, and the loss of life.

The comatose dying patient, like the non-viable 'IVF' human embryo, need not be personally harmed by the act of killing, provided the killing is painless; and, inasmuch as the patient has no knowledge of the threat to his/her life, he/she is not put in fear of being killed. Moreover, if one accepts that, from a subjective perspective, there is

no difference between an irreversible unconscious state of being and death, then the comatose dying patient is not harmed by the loss of his/her life. As Thomas Nagel writes

> The value of life and its contents does not attach to mere organic survival: Almost everyone would be indifferent (other things equal) between immediate death and immediate coma followed by death twenty years later without reawakening. 28

On the other hand, the killing of a comatose dying patient during the course of life-threatening research could potentially harm the family and friends of the patient, the researcher/killer, and society. This is because the non-viable patient, unlike the non-viable 'IVF' human embryo, "holds a place as a specific individual ... in a network of human emotion and expectations."[29] The crucial difference then, between experimenting upon and killing the non-viable 'IVF' human embryo, and doing the same to a comatose dying patient, is that with the non-viable embryo no harm is done, whereas with the comatose dying patient the secondary harms come into play and are morally significant.

Consider, for example, a young girl of twelve who, as a result of a car accident, is in a comatose state and is expected to die imminently. The use of this patient for life-threatening research could harm the family and friends in significant ways. For example, a family member (or friend acting as proxy) may experience an extreme sense of guilt at having consented to the killing of a relative (or

close friend), and/or he/she may perceive of him/herself as a murderer.

Certainly, some comatose dying patients will have no family or friends left in the world, and some families and friends will be able to convince themselves that in consenting to research they have done something laudable, as opposed to reprehensible. There is still, however, the potential harm to the researcher/killer and to society at large that comes from the killing of dying patients during the course of research.

The researcher/killer, for instance, risks "being made a worse person by having done something which is wrong or which he thinks is wrong."[30] In addition, there are the possible dehumanizing effects on the researcher from the performance of 'deadly' research on living research subjects. Society, on the other hand, may be harmed "by wrongdoing within it, both directly and through the weakening of the force of its moral norms."[31] Also of concern is the possible anxiety caused to those who might consequently believe themselves to be in danger. These possible harms are described by Toulmin in terms of the

> fear that any relaxation in the general feelings of reverence and concern towards the tissues and remains of the dead and dying could give the color of extenuation to other forms of callousness, violence and human indifference. 32

Whereas the killing of non-viable 'IVF' human embryos results in the death of human cell clusters, the killing of comatose dying patients is readily identifiable with the

killing of self and other members of society.

As noted previously, some of the reasoning outlined above may seem circular, in that it presupposes the wrongfulness of killing. Thus, one might argue that these harms cannot explain why the act of killing is itself wrong. This circularity is unavoidable, however, as much of the harms to society caused by the act of killing stems from the violation of its moral norms, and similarly, much of the harm to the murderer stems from the belief that he/she has perpetrated a wrongful act.

The belief that killing comatose dying patients is inherently wrong is currently under attack by those who advocate active euthanasia on the basis of quality of life judgments. Proponents of this viewpoint commonly maintain that there is no morally relevant difference between withholding treatment that cannot benefit a patient whose death is impending and actively seeking to bring about his/her death. Conceivably, therefore, the killing of comatose dying patients might eventually be considered morally acceptable. An important moral distinction would remain however, between killing patients to relieve "suffering" and killing them for the benefit of others as would be the case if life-threatening research were sanctioned.

This brings us to consider the slippery slope argument against destructive research on non-viable 'IVF' human embryos. The fear is that if such research were permitted,

then similar research on comatose dying patients would also be sanctioned, as would be life-threatening research on those who are terminally ill, those who are in a permanent vegetative state, those with severe mental handicaps, those who were socially unproductive, etc.

As previously noted, of concern with slippery slope arguments are the principles used to justify the first steps down the slope and whether these principles justify in advance further steps (Cf. Chapter Two). The justification of destructive research on non-viable 'IVF' human embryos rests upon the claim that such embryos are morally equivalent to human cell clusters, and that any obligation there might be not to kill them may be overridden in the pursuit of other significant values. These principles do not justify life-threatening research on dying comatose patients. These patients, by virtue of their (actual or prior) moral standing and their symbolic value, are not morally equivalent to human somatic cells. In virtue of this moral difference, the obligation not to kill dying comatose patients is greater than the obligation not to kill human cell clusters, sufficiently so as to invariably preclude life-threatening research on comatose dying patients.

It follows that the argument for research on non-viable 'IVF' human embryos does not justify, in advance, research on comatose dying patients. For this research to be permitted, a further principle would have to be advanced,

for example, one that stipulated that any and all means were acceptable in securing a "benefit to others". This is not one of the principles used to justify research on non-viable 'IVF' human embryos. Any argument that relied on this (or some other similar) principle would therefore be significantly different from the one defended here.

For similar reasons the argument for limited research on non-viable 'IVF' human embryos does not justify research on those born dying. Newborns with anencephaly, with thanataphoric dwarfism, or with spina bifida with myeloschisis -- to name but a few -- count as specific individuals in the network of human emotion. Like the dying comatose patient, they too are not morally equivalent to human tissue and ought not to be treated as such.

Research on non-viable 'IVF' human embryos is distinct from all other research on non-viable humans because only non-viable embryos are morally equivalent to human somatic cells. The comatose dying patient and the child born dying, like the non-viable 'IVF' human embryo, do not have much of a future, but they have a radically different past. However, short or long that past is, it imposes upon us different moral obligations.

Arguments for the instrinsic wrongness of research on non-viable 'IVF' human embryos

In addition to the consequentialist objections to the use of a non-viability criterion for research on spare 'IVF' human embryos, there are arguments intended to

establish its intrinsic wrongness.

In 1987, the Catholic Church published its Instruction On Respect For Human Life in Its Origin and on The Dignity of Procreation.[33] In this document, care is taken to "distinguish between experimentation carried out on embryos which are still alive and experimentation carried out on embryos which are dead."[34] Intentionally, however, no distinction is made between the study of viable, as opposed to non-viable, embryos.[35] In either instance the research is expressely forbidden, unless it is aimed at saving the embryo's life:

> If the embryos are living, whether viable or not, they must be respected just like any other human person; experimentation on embryos which is not directly therapeutic is illict.
>
> No objective, even though noble in itself, such as a foreseeable advantage to science, to other human beings, or to society, can in any way justify experimentation on living human embryos or foetuses whether viable or not, either inside or outside the mother's womb. 36

This absolute prohibition on non-therapeutic embryological research is clearly opposed to the proposal put forth for limited research on non-viable 'IVF' human embryos. Significantly, however, the moral disagreement identified here is not essentially factual, nor is it due to some failure of rationality; rather, the disagreement amounts to a conflict at the level of fundamental moral principles. This kind of disagreement, unfortunately, often cannot be resolved by rational discourse since ultimate moral principles are not amenable to direct proof.

Those who fervently believe that absolute (i.e. unconditional) protection is due the human embryo from the moment of conception onward -- regardless of all other considerations -- may not be able to defend this belief rationally, but it is unlikely that they will be persuaded to believe otherwise by any argument against the sanctity of life principle. This is not because such arguments are necessarily flawed, but because the first premises are unacceptable. On the other hand, those who accept that non-viable 'IVF' human embryos are morally equivalent to human somatic cells, will find the level of protection demanded in the Instruction on behalf of non-viable embryos extreme, particularly as there is no argument provided in support of the presumption that non-viable 'IVF' human embryos are morally equivalent to viable ones.

In defense of the prohibition of all embryo research there is, in the Instruction, a footnote to an Address by Pope John Paul II in which embryo research is condemned, "since the human being from conception to death cannot be exploited for any purpose whatsoever."[37] There is also a quote from The Charter of the Rights of the Family which stipulates that: "Respect for the dignity of the human being excludes all experimental manipulation or exploitation of the human embryo."[38] For those who already believe that all research on 'IVF' human embryos is intrinsically wrong, these references may be compelling. They do not, however, in themselves constitute a persuasive

argument against research on non-viable embryos because they do not speak directly to this issue. Instead, all embryos are treated as a class deserving of equal protection from invasive and destructive research.

Consider in this regard the following excerpt from the submission of the St. Vincents Bioethics Centre, at St. Vincents Hospital in Victoria, to the Australian Senate Select Committee:

> Now, when this event has taken place [fertilization] and a new centrally organised unity has been established, quite distinct from the organisation of the preceding sperm or egg ... a whole set of very remarkable capacities has been established. Allowing for the normal availability of nourishment and a non-hostile environment, the progenitor cell already has the capacity for directing its own development in such a way that a brain is developed suitable for all those activities which we saw to be characteristic of human beings, the activities that persons can perform. The capacities for those activities already exist in the genetic material of the progenitor cell. 39

As we have seen, however, the posited capacities are not uniformly present from the moment of conception. Consequently, it does not follow that profound respect is due <u>all</u> embryos. By comparison, one of the distinct advantages of the proposed alternative approach to 'IVF' human embryo research is that embryos are not regarded as a homogeneous class. Rather, differences in potential are recognized and an effort is made to critically assess the moral significance of this difference.

<u>Merits of the Positive Thesis</u>

As noted repeatedly throughout the dissertation,

existing proposals for limiting 'IVF' human embryo research to a particular developmental stage invariably rely upon arguments that either overemphasize or ignore certain aspects of the developmental process. By comparison, with the proposed alternative, moral relevance is not attributed to any particular developmental stage. This avoids many of the problems with existing accounts of what constitutes morally acceptable research, and also explains the absence of any argument for a specific time limit. Given the ethical constraints proposed regarding 1) the subject population (non-viable 'IVF' human embryos) and 2) the nature of the research (legitimate end(s) and appropriate means), a time limit would be nonsensical.

This contrasts markedly with most of the other proposed guidelines for 'IVF' human embryo research, that recommend some developmental limit beyond which embryological research may not be undertaken. The limit supposedly marks the point at which the 'IVF' human embryo achieves a degree of moral standing (in virtue of its development), sufficient to warrant its protection from invasive and destructive research. With the proposed alternative approach to 'IVF' human embryo research, moral significance is not attributed to any developmental stage but to the potential for development tout court.[40]

Another benefit that devolves from the introduction of a moral distinction between viable and non-viable 'IVF' human embryos is that if, on an exceptional basis,

research on viable embryos were permitted, there would then be a further category of research subjects upon which to experiment, prior to initiating research involving viable embryos. That is, if there were a sound argument for proceeding with research on viable 'IVF' human embryos, another benefit to be derived from the introduction of a moral distinction between viable and non-viable 'IVF' human embryos is that one could limit the wastage of viable embryos by using non-viable ones to test some of the early hypotheses, and to perfect the proposed research methods.

A further benefit of the proposed alternative is that the concept of viability -- defined in relation to the entity's potential for continued growth and development given available medical technology -- is helpful in developing a consistent understanding of how we ought to treat developing human life. For those who believe in the sanctity of life principle, embryo research, fetal research, abortion, and the non-treatment of defective newborns are all morally unacceptable practices. For those who allow embryological research up to a certain developmental stage, however, no one consistent approach to these practices recommends itself.

An advocate of limited embryological research could equally argue that abortion, fetal research, and the non-treatment of defective newborns are, or are not, morally acceptable. Essentially, the argument against the moral acceptability of any of these practices would stipulate

that beyond the limit set for embryological research all developing human life is entitled to full protection. Conversely, in defense of abortion, fetal research, and the non-treatment of defective newborns, one could emphasize the anticipated benefits of any of these practices, the conflicting rights of the mother, or the poor quality of life for the developing human, in order to justify a differential in the protection afforded the early 'IVF' human embryo, on the one hand, and the fetus or handicapped newborn, on the other.

By comparison, with the proposed definition of viability as a morally relevant criterion, the beginnings of a coherent approach to developing human life can be formulated. In this view, with appropriate consent, abortion, fetal research, and the non-treatment of defective newborns are morally permissible with those who are non-viable (see caveat n.40). In addition, just as there is a morally relevant difference between experimenting upon non-viable 'IVF' human embryos and experimenting upon defective but viable embryos (recall the earlier distinction between embryo viability and embryo quality) so too there is a moral difference between abortion for fetal indication, research on defective fetuses, and the non-treatment of handicapped newborns when the disorder is serious, but not imminently, and unavoidably, fatal. The morally relevant criterion with the proposed alternative approach is the capacity for life

tout court and not the capacity for meaningful life, however this might be defined.

In sum, the merits of a non-viability criterion for 'IVF' human embryo research are significant, particularly if one measures these benefits against the disadvantages of the criteria presently en vogue -- i.e. the completion of implantation and the formation of the primitive streak.

Conclusion

As noted in the introduction, the option of using spare 'IVF' human embryos for research purposes raises important questions concerning how we ought to treat nascent human life. All too often, however, these questions are side-stepped. Instead, the focus is on the debate regarding the moral status of the 'IVF' human embryo, and the possible societal consequences of such research.

Generally speaking, with the debate concerning the moral acceptability of 'IVF' human embryo research much energy is expended in an effort to show unequivocally that the 'IVF' human embryo either qualifies, or fails to qualify, as human or person. But are humans or persons the only bearers of rights, such that the 'IVF' human embryo must first qualify as human or person in order to claim the right to life? Alternatively, if we consider duties instead of rights, are humans or persons the only beings deserving of protection from life-threatening actions? Surely the question of protection for the 'IVF' human embryo should not be decided merely on the basis of

evaluative and stipulative definitions. Why then the endless (and fruitless) quest for the uncontroverted definition of the essentially contested concept of humanhood or personhood?

Along with Warnock,[41] Hare,[42] and others, I believe that the debate concerning the moral acceptability of 'IVF' human embryo research must not be allowed to stagnate around questions of humanhood or personhood. As Hare writes:

> ... we should stop wasting so much breath on the question of whether the embryo (or the foetus) is a person or not, and other such questions, which though they have been thought to be crucial, in fact settle nothing, and merely divert us from the main moral problems about how we ought to treat foetuses and embryos. 43

Thus, in an attempt to properly orient the debate on 'IVF' human embryo research -- so as to deal directly with the central question of how we should treat spare 'IVF' human embryos -- I focus instead on the harms that come from the taking of life. This approach is suggested by Bok who writes:

> To question someone's humanity or personhood is a first step to mistreatment and killing.
>
> We must abandon, therefore, this quest for a definition of humanity capable of showing us who has a right to live. We must seek, instead, common principles for the protection of life that reflects a clear understanding of the harm that comes from the taking of life. 44

Following this reasoning, the harms that come from the taking of life are carefully examined to see whether they apply to 'IVF' human embryos. With one exception, it is

found that these harms fail to apply. That exception is the harm caused by the loss of life. On the assumption, then, that the principle "do no harm" is an appropriate principle to guide decision making regarding 'IVF' human embryo research, a prima facie obligation not to kill 'IVF' human embryos is recognized. In the case of non-viable embryos, however, this obligation is diminished in virtue of the absence of any potential for ongoing human development.

On this basis, it is argued that whereas the value of scientifically and ethically sound embryological research is sufficient to outweigh the value attributable to non-viable 'IVF' human embryos, it is generally not sufficient to outweigh the value attributable to viable ones. This leads to the conclusion that non-viable 'IVF' human embryos may routinely be used for research purposes, provided the other requisite ethical constraints are met.

The proposed alternative approach to embryological research raises a number of difficult questions, and for some the answers provided may not be satisfactory. It is to be hoped, however, that the new questions introduced ultimately will be helpful in effectively resolving the controversy regarding 'IVF' human embryo research.

NOTES

[1]The Ciba Foundation, Human Embryo Research: Yes or No? (London: Tavistock Publications, 1986), 78 (see comment by Robert Edwards). Also, personal communication Tim Appleton PhD, Secretary of the Bourn Hall ethics committee (Bourn Hall, England) and Ian Pike PhD, scientist with the Human Reproduction Unit at Royal North Shore Hospital (Sydney, Australia).

[2]Robert Edwards, "Potential Research on Human Embryos," in Future Aspects in Human In Vitro Fertilization, eds. W. Feichtinger, and P. Kemeter (Berlin: Springer-Verlag, 1987), 246.

[3]The Ciba Foundation, Human Embryo Research: Yes or No? 58 (see comment by David Baird).

[4]P.R. Braude, V.N. Bolton, and N.H. Johnson, "The Use of Human Pre-Embryos for Infertility Research," in Human Embryo Research: Yes or No? 70; and Robert Williamson, "Research Needs and the Reduction of Severe Congenital Disease," in Human Embryo Research: Yes or No? 109.

[5]It is not my intention to suggest that there is agreement within the scientific community concerning the usefulness of research on non-viable 'IVF' human embryos, but only to point out that a number of prominent scientists use, and advocate the use of, non-viable 'IVF' human

embryos for research purposes.

[6]Robert Williamson, "Research Needs and the Reduction of Congenital Disease," in Human Embryo Research: Yes or No? 109-110.

[7]The Ciba Foundation, Human Embryo Research: Yes or No? 210 and 79 (see comments by Robert Edwards).

[8]A number of scientists currently use non-viable 'IVF' human embryos for research purposes, and it seems reasonable to conclude that they would endorse the views expressed by Williamson and Edwards. Trounson, for example (another prominent embryologist), recently submitted a research proposal to the Standing Review and Advisory Committee on Infertility in Victoria, Australia to develop biopsy techniques on embryos that take "longer than normal to fertilise and are currently discarded because scientists believe they may carry a range of genetic defects." See, "Public Opposition to Embryo Biopsy" Lancet (March 4, 1989): 489.

[9]H.J. Leese et al., "Uptake of Pyruvate by Early Human Embryos Determined by a Non-Invasive Technique," Human Reproduction 1, no. 3 (1986): 181-182.

[10]Robert Williamson, "Research Needs and the Reduction of Severe Congenital Disease," 113-114.

[11]Usually fetal tissue for research purposes is available through abortion. Abortions need not result in the immediate death of the fetus, however. There is, therefore, an important distinction between the use of

tissue from dead fetuses and the use of tissue from live abortuses that may or may not be capable of survival.

[12]Because the dissertation is limited to a defense of the claim that it is both scientifically and ethically valid to proceed with research on non-viable 'IVF' human embryos, the competing values which might reasonably outweigh the value attributed viable embryos are not investigated.

[13]Note the similarity between this potential objection to the use of a non-viability criterion for 'IVF' human embryo research and the familiar objection to the use of technologically-assisted fetal viability as a moral demarcation line for abortion. In both instances, the concern is that, in time, the guidelines originally introduced to permit limited research in the one case, and limited abortion in the other, eventually would prohibit all research and all abortions respectively.

[14]Any such obligation founded on religious beliefs or traditions are not considered here.

[15]An explination of the analogy between "dying 'IVF' human embryos" (i.e. inherently non-viable 'IVF' human embryos that can be rendered viable) and human somatic cells can be found on page 209.

[16]The obligation to avoid causing harm and the obligation to benefit are distinct obligations. Only with utilitarianism, where the maximization of the good is to be achieved not only through the minimization of harm but

also through the maximization of benefit, might the distinction collapse.

[17]The obligation to freeze dying embryos is stated in tentative terms because presumably this obligation would only have moral force in those instances where the embryos were afflicted with disorders for which specific cures would soon be available. The remote possibility that someday a cure may be developed for a specific fatal disorder does not in itself create an obligation to freeze all embryos afflicted with the disorder for an indefinite period of time. This is because the obligation to cure is owed to the prospective parents (not to the dying embryos, or to the 'future' viable embryos) and so, presumably, it would only have effect during their lifetime.

[18]Rarely would there be reason for the couple to request the genetic manipulation of their dying 'IVF' human embryos. Invariably it would be preferable for there to be new embryos created for transfer than for manipulated embryos to be transferred. The only exception to this would be if both partners were homozygous for the same recessive gene, in which case there would be no normal embryos available for transfer.

[19]C.A. Wentz et al., "The Problem of Polyspermy in In Vitro Fertilization," Fertil and Steril 40, no. 6 (December 1983): 748-754.

[20]Mary Warnock, A Question of Life (Oxford: Basil Blackwell, 1985), 68.

[21]New South Wales Law Reform Commission, In Vitro Fertilization, Report 58 (New South Wales: Law Reform Commission, 1988), 82.

[22]The Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization, Report on the Disposition of Embryos Produced by In Vitro Fertilization, Report 4 (Melbourne: F.D. Atkinson Government Printer, August 1984), 46.

[23]A terminally ill newborn is not necessarily a child born dying. Similarly, a terminally ill comatose patient is not necessarily a dying comatose patient. 'Incurability' is not co-extensive with 'impending death'. See Paul Ramsey, Ethics at the Edges of Life: Medical and Legal Intersections (New Haven: Yale University Press, 1978), 187-188.

[24]Richard Wasserstrom, "Ethical Issues Involved in Experimentation on the Nonviable Human Fetus," in Biomedical Ethics and the Law, 2d ed., eds. James Humber and Robert Almeder (New York: Plenum Press, 1976), 292. Wasserstrom maintains that "to describe the fetus as non-viable is to concede that no matter what is done, all signs of life will disappear from the fetus within a very short period of time, i.e., not more than four or five hours" (292). For this reason, his claims regarding the concept of viability can be applied to the issue at hand.

[25]Ibid., 292.

[26]These imaging techniques were not available when

Wasserstrom wrote the passage cited. If they had been, it is conceivable that Wasserstrom might have argued differently.

[27]To be useful in this context the concept of non-viability would have to be refined somewhat in order to clarify some of the background assumptions. Also, some kind of time frame would have to be specified. What this might be, I don't know. Like Ramsey, however, I believe that this is a medical judgment to be made by "physicians who can and do determine -- in human, no doubt fallible judgment -- the difference between dying and nondying terminal patients." See Paul Ramsey, Ethics at the Edges of Life, 187.

[28]Thomas Nagel, Mortal Questions (Cambridge: Cambridge University Press, 1979), 2.

[29]Samuel Gorovitz, "In Vitro Fertilization: Sense and Nonsense," Apppendix, HEW Support of Research Involving Human In Vitro Fertilization and Embryo Transfer Department of Health, Education and Welfare Ethics Advisory Board (Washington D.C.: U.S. Government Printing Office, 1979), 6.

[30]Philip Devine, The Ethics of Homicide (Ithaca: Cornell University Press, 1978), 18.

[31]Ibid., 19.

[32]Stephen Toulmin, "Fetal Experimentation: Moral Issues and Institutional Controls," in The National Commission for the Protection of Human Subjects of

Biomedical and Behavioral Research, Appendix: Research on the Fetus (Washington: Department of Health Education and Welfare, 1975), 10.11.

[33]Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day (Vatican City: The Congregation, 1987).

[34]Ibid., 16.

[35]Nowhere in the Instruction is the term 'viable' defined. It is possible, therefore, that the term is used to refer to the embryo's ability to survive outside of the womb, and not to its potential for further development. Nevertheless, it is reasonable to conclude that the Catholic Church would reject the proposal for limited research on living embryos with no potential for further development, given its teachings on the dignity of human life and procreation, and given its insistence in this text on the distinction between living and dead embryos.

[36]Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation, 16-17.

[37]Pope John Paul II Address to a Meeting of the Pontifical Academy of Science, 23 October 1982: AAS 75 (1983), 37. Quoted in Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation, 17.

[38]Holy See, Charter of the Rights of the Family, 4b:

l'Osservatore Romano, 25 November 1983. Quoted in Congregation for the Doctrine of the Faith, Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation, 17.

[39]Senate Select Committee on the Human Embryo Experimentation Bill 1985, Human Embryo Experimentation in Australia (Canberra: Australian Government Publishing Service, 1986), 12-13.

[40]If it were ever possible to sustain non-viable 'IVF' human embryos ex utero up to, or beyond, a point at which the embryo were capable of experiencing pain, a further ethical constraint upon embryological research would have to be introduced, viz., that the embryo not experience pain. If, for some reason, it were not possible to satisfy this condition using available drugs, then either research on non-viable 'IVF' human embryos would have to be limited to non-viable pre-sentient embryos or, alternatively, there would have to be restrictions on research involving non-viable sentient 'IVF' human embryos.

[41]Mary Warnock, "Do Human Cells Have Rights?" Bioethics 1, no. 1 (January 1987): 1-14.

[42]R.M. Hare, "An Ambiguity in Warnock," Bioethics 1, no. 2 (April 1987): 175-178.

[43]Ibid., 175.

[44]Sissela Bok, "Who Shall Count as a Human Being? A Treacherous Question in the Abortion Discussion" in Abortion Pro and Con, ed. Robert, Perkins (Cambridge,

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