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Introduction:

This book will provide a reference for pro-life activists, students, legislators, teachers, clergy and interested individuals about the range of activities and procedures that make up what we have referred to generally as the Early Life Issues, that is those surrounding artificial procreation; the creation and manipulation of human beings at the embryonic stage of life. The subject is immense and is one of the fastest growing scientific fields of our day. To effectively defend the fullness of the pro-life position, familiarity with the basic concepts is necessary and not difficult.

The term, new reproductive technologies (NRT) refers to all methods of artificial procreation either sexually by the joining of ova and sperm or asexually by various methods that have become known collectively as “cloning”.

Outside the immediate realm of NRT but closely related to them, recent developments have given us the intricate world of embryonic research, experimental cloning and genetic manipulation. In the pure research areas, medical and other experimentation is performed on living human embryos, usually those left over (often called “spare”) after various artificial fertilization techniques and stored cryogenically; or so-called “fresh embryos”: those created either sexually or by cloning for the purpose of experimentation.

In the second category is included all kinds of manipulation of human life at the embryonic stage for eugenic or other purposes, germ-line alteration, and selection/diagnosis techniques.

The two areas of study together make up the Early Life Issues (ELI). The second area, that of pure research, has created an entire new field in the biotechnology industry which is lobbying heavily for the use of live human beings at the embryonic stage of life. Often the research proposed is purely experimental and does not pertain to fertility. In some cases, the research does not even aim at finding cures for diseases and

represents the end-result of the aims of the eugenics movement to manipulate and "improve" the human species.

When studying the Early Life Issues, a firm grasp on the basics of the pro-life philosophy is essential. Without understanding the twin premises – that a human being in the fullness of his moral status exists at the earliest moments of the single-cell stage; and that human beings may not be killed, experimented upon, donated or in any way treated as chattel – the pro-life position on ELI cannot be grasped or defended effectively. This book, therefore, will outline the philosophical problems presented by those who advocate for creating and using embryonic human beings for research and provide the means for making effective counter arguments.

The text is divided into five parts:
Part I gives an explanation and description of the various activities that form the subject of the Early Life Issues, including artificial procreation techniques and purely experimental research.

Part II, on the ethics of the Early Life Issues, examines the nature of the ethics problem of our times. It offers a brief description of the philosophical movements that have shaped the current situation and offers a short course in making the pro-life case against embryo experimentation and new reproductive technologies in general.

Part III will give an overview of the current situation in Canada, a brief history of the pro-life effort surrounding the current legislationd.

Part IV gives a brief overview of the situation around the world.

Part V gives a list of resources where further information and/or indepth studies can be found both online and in print.

Appendices include glossaries of relevant biotechnological and philosophical terms,

Part I: A brief description of the Early Life Issues.

1. When does a human being begin?[1]

Fertilization: (also known as conception) is the fusion of gametes[2] to form a new organism of the same species. In animals, the process involves a sperm fusing with an oocyte, which begins the development of the embryonic child. The spermatozoon and the oocyte[3] meet and interact in the fallopian tube. After finding the oocyte, the sperm binds to the zona pellucida, a protein membrane surrounding an oocyte.

Fusion between the sperm and oocyte plasma membranes follows, allowing the entry of the sperm into the oocyte. At this point the embryo comes into existence and is genetically distinct from either of the original sex cells.[4]

Once the single sperm cell has fused to the outer membrane of the oocyte, the membrane changes, preventing fusion with other sperm.

With the fusion of chromosomes from oocyte and sperm, a new, genetically distinct human being exists that is alive and separate from, though dependent upon the mother.

[1] The question at the head of this section is phrased slightly differently from the usual, "when does human life begin?" In the current debate, the pertinent question is not one of biology, which is settled, but of competing philosophies. Many are convinced that a human being, the biological entity that is a genetic member of the human species, exists from the single-cell stage, but will continue to insist that, though human, it has no natural rights to legal protection. The distinctions commonly made between a "human life," a "human person," and a "human being" will be more fully explored in the section on ethics below.

[2] Gametes: mature male or female sex cells.

[3] Oocyte: female gametocyte or germ cell involved in reproduction.

[4] The term "fertilised egg" found commonly in the media, is an error and betrays either ignorance of embryology or a bias in favour of allowing abortion or other interventions in human development like embryonic stem cell research. There is no such thing as a human "egg" and a "fertilised oocyte" is an embryo. Mammals, for the most part, do not have eggs. This topic is further explored in Part II 2.

This process leads to the formation of a diploid[5] single-cell zygote[6]. The zygote is the earliest stage of human development in which the complete genotype, or genetic system of the human individual is in place .

The process of cell division continues and when the zygote has formed a ball of 12 to 32 cells it is referred to as a "morula." More division follows until the embryo has formed a small central cavity, called the blastocele. The embryo now consists of an outer cell mass, or trophoblast, that forms a hollow ball, containing an inner cell mass. This stage is called the blastocyst.

The trophoblast will later form the placenta and the cells of the inner mass will develop to form all the tissues of the child's body. Both inner and outer cells of the blastocyst are called blastomeres.[7]

The blastocyst continues to travel down the fallopian tube until it reaches the uterus and implants in the endometrium. The human blastocyst comprises 70-125 cells.

A Genetically Distinct, Alive and Separate, Human Being

The usual way most life forms reproduce, whether plants or animals, is sexually, that is, by the joining of male and female gametes from two members of the same species. In human beings, the sperm and oocyte are ready to join when they contain the requisite numbers and organization of genes in their nuclei: 23 each. When the sperm penetrates the oocyte, the two sets of chromosomes are joined and a new human being comes into

[5] In diploid organisms (most plants and animals), each chromosome is inherited from a different parent. Haploid cells contain exactly half of a species typical full set of genetic material: in the case of humans, 23 chromosomes each. When they are ready to fuse, oocyte and sperm are haploid.

[6] A zygote is a single-cell embryo, the result of fertilization. That is, two haploid cells, an oocyte from a female and a sperm cell from a male, merge into a single diploid cell called the zygote. Twins and multiple births can be monozygotic (identical) or dizygotic (fraternal), meaning they arise from one or two separate fertilization events.

[7] The inner blastomeres are what is usually referred to in the media as "embryonic stem cells" sought by researchers. These "pluripotent" cells have the ability to form all the tissues of the human body. The removal of the inner blastomeres for research usually causes the death of the embryonic person.

existence, one with a unique and irreproducible genetic combination of 46 chromosomes.

After this genetic system is in place, the new individual begins to grow using the DNA[8] blueprint that gives its body directions on how to develop. The zygote does not change its nature and become a human being at some point of its existence, it and the adult are one and the same being.

From the first moment of fertilization,[9] therefore, a complete, living, growing, genetically distinct member of the human species comes into existence that is no "part" of the mother but is physically dependent upon her for nutrition and a protective environment.

The DNA "blueprint," or genotype, of the new individual is complete from the one-cell stage. That a complete and living human being is fully in existence from the single-cell stage is confirmed by over a hundred and fifty years of findings in the field of human embryology and is the basis of the pro-life assertions in the Early Life Issues as well as abortion. No scientific finding in the field of human embryology has disproved this assertion.

From the moment of conception, the single-cell zygote also fulfills all criteria for independent life. Scientific textbooks give five basic characteristics or criteria for living things:

1. Living things are highly organized.
2. All living things have an ability to acquire materials and energy.
3. All living things have an ability to respond to their environment.
4. All living things have an ability to reproduce.
5. All living things have an ability to adapt.

[8] DNA: Deoxyribonucleic acid. A nucleic acid that contains the genetic instructions specifying the biological development of all cellular forms of life (and most viruses).

[9] Fertilization: properly understood to be a process beginning with the penetration of the oocyte by the sperm and ending with the appearance of two fused pronuclei that together contain the 46 chromosomes of human DNA, as a single-cell zygote.

The human embryo fulfills all these scientific requirements for life. It is highly organized and complex; scientists are only beginning to understand the intricacies of single-cell embryos. It processes nutrients from its environment even before it has attached to the uterine wall. It has the ability to respond to and adapt to its environment, and has the ability to reproduce with cell division. It is also intrinsically endowed with the potential, upon reproductive maturity, to reproduce other members of the species.

Supporting References

“A new individual is created when the elements of a potent sperm merge with those of a fertile oocyte, or egg.”

Encyclopedia Britannica, “Pregnancy,” page 968, 15th Edition, Chicago 1974

“Everyone begins life as a single cell.”

Dr. David Galton, a professor of the Wolfson Institute of Preventive Medicine, St. Bartholomew's Hospital Medical School, London, “Eugenics: the Future of Human Life in the 21st. Century”

“I oppose abortion. I do so, first, because I accept what is biologically manifest – that human life commences at the time of conception – and second, because I believe it is wrong to take innocent human life under any circumstances. My position is scientific, pragmatic, and humanitarian…Conception confers life and makes that life one of a kind.”

Dr. Landrum Shettles, discoverer of male and female producing sperm and a pioneer in the field of in vitro fertilization.

"The exact moment of the beginning of personhood and of the human body is at the moment of conception."

Dr. McCarthy de Mere, medical doctor and law professor, University of Tennessee:

"I am no more prepared to say that these early stages represent an incomplete human being than I would be to say that the child prior to the drmatic effects of puberty . . .is not a human being."
Dr. Alfred Bongiovanni, University of Pennsylavania School of Medicine.

"By all the criteria of modern molecular biology, life is present from the moment of conception."
Dr. Hymie Gordon, Chairman, Dept. of Genetics at the Mayo Clinic:

"It is the penetration of the oocyte by a spermatozoa and the resulting mingling of the nuclear material each brings to the union that constitutes the culmination process of fertilization and marks the initiation of the life of an individual."
Moore, Keith L., The Developing Human: Clinically Oriented Embryology, p. 12, W.B. Saunders Co,. Philadelphia, 1974.

"…The merger is complete within twelve hours, at which time the egg – which may have 'waited' as many as forty years for this moment – is fertilized and becomes known technically as the 'zygote' containing the full set of forty-six chromosomes required to create human life. Conception has occurred. The genotype – the inherited characteristics of a unique human being – is established in the conception process and will remain in force for the entire life of that individual. No other event in the biological life is so decisive as this one; no other set of circumstances can ecen remontely rival tenotype in 'making you what you are.' Conception confers life and makes you one of a kind."
Dr. Landrum Shettles, M.D., , David Rorvik, Rites of Life: The Scientific Evidence forLife Before Birth, p. 36, Zondervan Publishing House, Grand Rapids Michigan, 1983.

Senate Judiciary Committee S-158, 97th Congress, 1st Session 1981
In April, 1981, a US Senate Subcommittee convened to examine the question, "When does life begin?" The official Senate report summarized, "there is overwhelming agreement on this point in countless medical, biological, and scientific writings."

Dr. Micheline M. Matthews-Roth of Harvard Medical School, supported by over 20 references from human embryology and other medical textbooks, testified:
In biology and in medicine, it is an accepted fact that the life of any individual organism reproducing by sexual reproduction begins at conception, the time when the egg cell from the female and the sperm cell from the male join to form a single new cell, the zygote; this zygote is the starting cell of the new system.

Most textbooks of embryology have chapters describing the history of embryology and the experiments done to show that multicellular organisms develop from a single cell, the zygote. Because these kinds of experiments in embryological development have been repeated so many different times on so many different species, and have always led to the same result…that organisms reproducing by sexual reproduction always arise from a single cell, and that they are always of the same biological species as their parents…this fact is universally accepted and taught at all levels of biological education. It is the continuous repetition, duplication and confirmation of experimental results that proves that the fact is indeed true…

It is scientifically correct to say that an individual life begins at conception…Our laws, one function of which his to help preserve the lives of our people, should be based on accurate scientific data.

Part I: A brief description of the Early Life Issues

2. What are New Reproductive Technologies?

New Reproductive Technologies (NRT) refer to any artificial intervention employed to obtain a living human being at any stage of development for “reproductive” purposes. That is, any method of making a human being in the embryonic stage of life by any means other than sexual intercourse.

Cloning is included in these because a human being is created and is fully in existence from the first moment of the proper ordering of the genetic material that makes up the human being at the earliest stage of life whether that ordering has been brought about by the combination of oocytes and sperm or by any other non-sexual method. A cloned human being is fully a human being at the earliest stage of his life.

Because of the size and complexity of the subject, however, cloning is treated in a separate section in this text.

A variety of techniques

Currently, techniques in use in fertility treatment facilities include:

- fertility enhancement drugs
- artificial insemination (AI)
- *in vitro* fertilization (IVF)
- intracytoplasmic sperm injection (ICSI)
- pre-implantation genetic diagnosis (PGD)
- zygote intrafallopian transfer (ZIFT)
- gamete intrafallopian transfer (GIFT)
- assisted hatching
- twinning or blastomere separation
- surrogacy
- embryo “adoption”
- gamete donation

Recent experimental advances include the creation of embryos from sperm or oocytes only; the creation of embryos using combinations of human and animal DNA; the development of artificial wombs; and the creation of genetically matched embryos to be used as tissue donors for siblings or other relatives with serious illnesses.

Fertility Enhancement Drugs

Synthetic hormonal agents that stimulate ovarian follicle[10] development are often tried first in cases where infertility is the result of anovulation. These drugs fall into two categories: clomiphene citrate (commonly called Clomid or Serophene), given in pill form; and the injectible Gonadotropins (sold as Humegon, Pergonal, Repronex, Fertinex, Follistim and Gonal-F.)

Clomiphene citrate works by "tricking" the system into thinking there is insufficient estrogen and indirectly stimulating the ovaries. Gonadotropins contain follicle stimulating hormone (FSH) and directly stimulate the ovaries.

Fertility drugs are often associated with the increased incidence of multiple births. In one famous case in the UK, a woman using them found that she was pregnant with seven children at once. In such cases, it is common for doctors to select and abort one or more of the children, in a procedure referred to as “selective reduction” or “foetal reduction”.

Artificial Insemination (AI)

AI is typically recommended as the first stop for the treatment of infertility due to:

- mild to moderate male factor infertility
- "unexplained" infertility
- cervical mucus insufficiency
- hostile cervical mucus
- various structural abnormalities in the woman

[10] Ovarian follicles are the roughly spherical aggregations of cells found in the ovary. containing a single oocyte. These structures are periodically initiated to grow and develop, culminating in ovulation of usually a single competent oocyte.

AI involves injecting a sample of specially treated sperm from the male partner, or a third party donor, into the female partner's reproductive tract. The sperm sample is obtained through masturbation. If the sperm is obtained from a donor, the resulting child will be the biological offspring of the woman and the donor, not the woman and her husband or chosen partner.

Different types of AI include:

- intracervical (in the cervical canal)
- intrauterine (in the uterine cavity)
- intrafollicular (in the ovarian follicle)
- intratubal (in the fallopian tubes).

When AI and/or fertility drugs fail, couples who can afford it often move to the more dangerous and invasive and expensive *in vitro* fertilization techniques.

***In vitro* Fertilization (IVF)**

The term '*in vitro*' is simply Latin for "in glass" and refers to the method of creating a new human being at the earliest embryonic stage of life by physically mixing together human sperm and oocytes in a laboratory. The resulting embryos are implanted into the uterus of the patient or a surrogate and brought to term. Those embryos not selected for implantation can be stored cryogenically, donated for scientific research or destroyed.

The practice was developed in the 1970's by Drs. Patrick Steptoe and Robert Edwards and was successfully employed for the first time in England with the birth, on July 25, 1978, of Louise Joy Brown who was hailed in the press as "the world's first test-tube baby." In fact, Louise Brown can more accurately be described as merely the first IVF baby to have been successfully brought to term.

The success rate for pregnancy with IVF is estimated by the best commercial clinics at about 15-25%, depending upon various factors such as the age of the woman. This means that it is common to have patients make several attempts, each costing thousands of dollars. In Canada, IVF treatments are not often covered by public health insurance plans and are laregly the province of private, for-profit clinics.

In normal IVF procedures, more embryos are created in each round of treatment than can be implanted at once and the so-called “spare” embryos are stored frozen in liquid nitrogen and can be thawed out and implanted for subsequent attempts.

The creation of multiple embryos enables several attempts with different embryos created in the same batch. It also enables the selection of embryos for various desired genetic traits and to “screen” for various potential medical problems such as Down’s syndrome or possible predispositions to heart disease or cancer. Preimplantation genetic diagnosis (PGD - see note below) by various methods is now normally offered as part of the IVF procedures in most clinics. Sex selection of embryos, though in some countries technically illegal, is also routinely offered as part of the program.

The IVF Procedure:

The procedure usually begins on the third day of menstruation and starts with a regimen hormonal drugs to stimulate the ovaries to begin producing oocytes at an accelerated rate. Typically approximately ten days of injections are required.

A procedure is then performed to retrieve the mature oocytes using an ultrasound-guided needle piercing the vaginal wall to reach the ovaries. The retrieval procedure takes about 20 minutes and is usually done under conscious sedation or general anaesthesia.

The oocytes are then examined for imperfections and those most likely to be fertilized are selected and mixed in a culture medim for about 18 hours. By that time fertilization should have taken place and the embryo would show two pronuclei[11].

They are left in the medium and allowed to develop to the 6-8 cell stage (about 48 hours.) In some cases the embryos are placed into an extended culture system until the blastocyst stage.

[11] Pronucleus is the haploid nucleus of a sperm or oocyte after fertilisation but before fusion of the nuclei.

Intracytoplasmic sperm injection (ICSI)
A procedure in which a single sperm is selected and injected directly into a mature oocyte using a micropipette. This procedure is most commonly used to overcome male infertility problems. After the procedure, the oocyte is placed into cell culture and checked for signs of fertilization and division.

ICSI is one of the artificial procreation techniques most frequently cited in studies on the incidence of birth defects in NRT's. Problems associated with ICSI include reduced testosterone levels in ICSI-conceived boys. Studies have shown a relationship between ICSI and infertility, cystic fibrosis, cancer, and developmental delays in children conceived by the method.

In March 2002, two major studies were published that found that babies conceived as a result of ICSI were twice as likely to suffer severe birth defects. The authors of one of the studies, published in the New England Journal of Medicine, concluded,

> *"As compared with natural conception, the odds ratio for a major birth defect by one year of age, after adjustment for maternal age and parity, the sex of the infant, and correlation between siblings, was 2.0 with intracytoplasmic sperm injection, and 2.0 with in vitro fertilization…*
>
> *"Infants conceived with use of intracytoplasmic sperm injection or in vitro fertilization have twice as high a risk of a major birth defect as naturally conceived infants."*

Preimplantation Genetic Diagnosis (PGD)
Many IVF facilities offer preimplantation genetic diagnosis, a procedure that is under development but is meant to detect possible abnormalities. It also detects possible genetic problems or genetic predispositions to future illnesses like cancer or heart disease. Those embryos not selected are normally either destroyed or donated for research.

In the procedure, a single blastomere is removed from the embryo after the trophoblast has formed. This is examined for genetic abnormalities. The removal of the blastomere from the days-old embryo can in some cases cause damage to the embryo.
Most IVF facilities include PGD as a normal service associated with fertility treatments and many hospitals will include “genetic counsellors” who may advise patients, based on a diagnosis of a genetic abnormality or possible inherited traits, to abort a child.

Gamete intrafallopian transfer (GIFT)

GIFT is used in instances where the fertility problem relates to sperm dysfunction, and where the couple has infertility from an unknown cause. Some patients may prefer the procedure to IVF for what are considered “ethical reasons”, since the fertilization takes place inside the body.

Fertility drugs are administered to the woman to stimulate ovarian follicles. When the follicles are mature, the woman is injected with Human Chorionic Gonadotropin (HCG). The oocytes are harvested approximately 36 hours later, mixed with sperm and the resulting zygote is placed in the woman's fallopian tubes using a laparoscope[12].

Zygote intrafallopian transfer (ZIFT)

ZIFT is used in cases where infertility is caused by a blockage in the fallopian tubes. Oocytes are retrieved from the ovaries and fertilized in the lab. The resulting zygote is then placed into the fallopian tube by the use of laparoscopy. The procedure is a spin-off of the gamete intrafallopian transfer (GIFT) procedure.

Assisted hatching

In the first stages of development, the embryo is surrounded by a strong membrane (made of glycoproteins) called the zona pellucida. Expansion of the embryo as it develops and grows, together with the production of enzymes causes the zona pellucida to open, releasing the embryo. This is called “hatching.” The embryonic cells then come in contact with the lining of the uterus, allowing implantation.

[12] Laproscopy is also called minimally invasive surgery (MIS), band aid surgery, keyhole surgery, or pinhole surgery. It is a surgical technique in which operations are performed through small incisions (usually 0.5 - 1.5 cm) as compared to larger incisions needed in traditional surgical procedures. It involves the use of a laparoscope, a telescopic rod and lens system that is usually connected to a video camera.

In some cases, the zona does not break down properly and a procedure, assisted hatching, is performed. Performed under a microscope assisted hatching involves holding an embryo with a pipette, and, using a fine needle filled with a hatching solution, a hole is drilled in the zona. The embryos are then transferred to the woman's uterus. Because there is now a hole in the zona, the embryo is more exposed to the environment and at risk of bacterial infection.

Blastomere separation or "Twinning"

Propagation of embryos by "twinning," or the separation of a blastomere from an early-stage embryo is a form of asexual reproduction and therefore is classed as cloning.

This procedure is common in animal husbandry and has been used in veterinary medicine for some years. The removal of blastomeres from a very early stage embryo does not always result in the death of the embryo but the risk of damage in any micromanipulation is high.

In blastomere separation a zygote created in vitro is allowed to divide until it forms a mass of about four cells. The outer membrane is removed and it is placed in a solution that causes the blastomeres to separate. Each blastomere is placed in culture where it forms an embryo containing the same genetic makeup as the original embryo, an identical monozygotic twin.

The cells in the inner cell mass of the blastocyst are also totipotent and can be induced upon removing them from the embryo to begin dividing as separate embryos. There are two methods of artificial twinning in use. In one, the most common, blastomeres are removed from the embryo and induced to begin division as separate embryos. In the other the entire embryo, including trophoblast, is split and the two parts induced to form two separate embryos.

Unlike the more difficult methods of cloning such as somatic cell nuclear transfer (SCNT), embryos formed by blastomere separation and blastocyst splitting include both the nuclear DNA and the mitochondrial DNA outside the nucleus of the original zygote.

Both kinds of “twinning” are advertised by IVF centers as a means of “embryo multiplication” - which could not only reproduce new embryos for infertility but also for pure research purposes only.

Surrogacy

A surrogate mother is also called a “gestational carrier.” Surrogacy is an arrangement whereby a woman agrees, either for monetary consideration or not, to become pregnant for the purpose of gestating and giving birth to a child for others to raise. She may be the child's genetic mother or she may be implanted with someone else's embryo (called gestational surrogacy**).**

Embryo adoption

IVF typically results in more embryos than can be carried to term by the clients. Unused embryos, often refered to in the press as “spare”, are often stored cryogenically, sometimes indefinitely. In some cases, the extra embryos are given, or sometimes sold, to other couples or women for implantation.

Legal cases are starting to become common in cases of embryo adoption and surrogacy over the “ownership” of embryos.

Pro-life ethicists are divided on the subject with some saying that once the embryo is created, adoption gives the best possible chance of life. Others argue that the implantation procedure is itself illicit and that such embryos ought to be allowed to die naturally, according to the same ethical criteria as individuals dependent upon life support machines.

Gamete donation

Donation of oocytes or sperm has become a mainstay of the IVF industry. Most NRT facilities keep a stock of gametes from donors to use in cases where infertility is caused by the clients’ own biological insufficiency.

To donate sperm a man must usually be screened medically to meet specific requirements regarding age and medical history. A man generally donates sperm at a

clinic by way of masturbation. Most establishments at which sperm is donated stock pornography to assist the donor in reaching orgasm.

Donated gametes have had an enormous impact on family law. In countries where IVF is common, laws are starting accept other categories of parenthood, especially in custody cases. A child conceived through donated gametes can have both “genetic” and “social” parents. A child conceived in this way and implanted in a surrogate mother can, in law if not in biological reality, have a genetic and a “social” father, a genetic, gestational or surrogate mother and a social mother. Theoretically a child thus could have 5 parents.

Other concerns with gamete donation surround privacy laws. In Canada, when legislation was being considered, some MP’s brought up the issue of donated gametes and the problem of assuring that a child knows his parentage. Sperm is normally donated anonymously, raising concerns of increasing the risk that rare recessive disease causing genes will become common in the population. Concerns were also voiced of unwitting consanguinity in marriage for the child concieved by donated sperm. One man in a posting on a website called the DonorSiblingRegistry.com claimed to have fathered at least 650 children via sperm donation.

This danger prompted Sweden, Norway, the Netherlands, Britain, Switzerland, Australia and New Zealand to disallow anonymous sperm donation. Canada and the US have no such limitation.

Part I: A brief description of the Early Life Issues

3. Stem Cells

Stem cells are found in all multicellular organisms and are produced by the human body from the earliest stages of its prenatal development. They combine the ability to reproduce indefinitely through mitotic[13] cell division and to differentiate[14] into particular types of tissue. The existence of stem cells has been known since the 1960's, when they were discovered by a pair of Canadian scientists, Ernest A. McCulloch and James E. Till.

These undifferentiated cells have been found to have varying degrees of plasticity[15]. Stem cells are present in the human body throughout the person's lifespan and, together with progenitor cells[16,] act to repair damaged tissue. So-called "adult" stem cells are those produced in the body throughout the individual's post-natal lifespan. They are abundantly produced by the bone marrow but are increasingly being discovered in other tissue sources.

There currently exist many therapeutic applications of adult stem cells. Treatments exist for some forms of cancer that involve screening stem cells from the patient's blood and re-inserting them into the body. Such treatments avoid the problem of tissue rejection and have led to research into replacing entire organs from the patient's own cells.

[13] Mitosis: division of the nucleus of any type of cell, separating the duplicated genome into two sets identical to the parent's. Stem cells replicate by mitosis.

[14] Differentiation: The process by which a cell acquires the characteristics and specialized function of a particular tissue type.

[15] Plasticity : the degree, varying in different types of stem cells, to which a stem cell is able to change into different tissue types.

[16] Progenitor cells are found in the various tissues of the body and can differentiate, but not renew themselves through dividing. Their main role is to replace cells lost by normal attrition.

Research on stem cells is advancing knowledge about how an organism develops from a single cell and how healthy cells replace damaged cells in adult organisms. This is often referred to as regenerative or reparative medicine.

What are Stem Cells? [17]

Stem cells are undifferentiated, or unspecialised cells that have the ability both to renew themselves by cell division for long periods and, under certain physiologic or experimental conditions, can be induced to become cells of a particular type of tissue such as the beating cells of the heart muscle or the insulin-producing cells of the pancreas.

Two broad categories of stem cells are known: those derived from human beings at the embryonic stage of life, usually called “embryonic stem cells” in the media, and those derived postnatally, often called “adult stem cells.” Scientists discovered ways to obtain or derive stem cells from early mouse embryos more than 20 years ago. In 1998 a method was discovered to isolate stem cells from living human embryos and grow the cells in the laboratory. These are called human embryonic stem cells, usually[18] taken from embryos created in fertility clinics through in vitro fertilization and donated for research.

Factors Common to all Stem Cells

One of the fundamental properties of any type of stem cell is that it does not have any tissue-specific structures that allow it to perform specialized functions. A stem cell cannot work with its neighbors to pump blood through the body (like a heart muscle cell); it cannot carry molecules of oxygen through the bloodstream (like a red blood cell); and it cannot fire electrochemical signals to other cells that allow the body to move or

[17] The information in this section is mostly taken from the website of the US National Institutes of Health, the US federal health research agency. http://stemcells.nih.gov/info/basics/basics1.asp

[18] Embryonic stem cells can also be isolated from cloned embryos. More information on so-called “therapeutic cloning” is included in the section on cloning.

speak (like a nerve cell). However, unspecialized stem cells can give rise to specialized cells, including heart muscle cells, blood cells, or nerve cells.

All stem cells are capable of dividing and renewing themselves for long periods. Unlike muscle cells, blood cells, or nerve cells—which do not normally replicate themselves—stem cells may replicate many times. When cells replicate themselves many times over it is called proliferation. A starting population of stem cells that proliferates for many months in the laboratory can yield millions of cells. If the resulting cells continue to be unspecialized, like the parent stem cells, the cells are said to be capable of long-term self-renewal.

Human Embryonic Stem Cells [19]

Embryonic stem cells are usually derived from a four or five days old embryo. The embryo at this stage is a ball of cells called the blastocyst. The blastocyst includes three structures: the outer ball, called the trophoblast, that will later form the placenta and supporting structures for the child after implantation; the blastocoel, which is the hollow cavity inside the blastocyst; and the inner cell mass, which is a group of approximately 30 pluripotent cells called blastomeres that will develop into all the tissues and structures of the child's body.

Human embryonic stem cells are isolated by removing the inner cell mass from the embryo and transferring it into a plastic laboratory culture dish that contains a nutrient broth known as culture medium. The original embryo dies when the inner cell mass is removed.

The cells then divide and spread over the surface of the dish. The inner surface of the culture dish is typically coated with mouse embryonic skin cells called a feeder layer that give the inner cell mass cells a sticky surface to which they can attach. The feeder cells convey nutrients into the culture medium.

[19] http://stemcells.nih.gov/info/basics/basics3.asp

After six months or more, the original 30 cells of the inner cell mass yield millions of embryonic stem cells. Embryonic stem cells that have proliferated in cell culture for six or more months without differentiating, are pluripotent, and appear genetically normal are referred to as an embryonic stem cell line.

Once cell lines are established, or even before that stage, batches of them can be frozen and shipped to other laboratories for further culture and experimentation.

Embryonic stem cells are pluripotent, meaning they are able to differentiate into all of the more than 220 cell types in the adult body. A pluripotent embryonic stem cell can form any of the three germ layers of the early term embryo: endoderm (that will develop the tissues of the interior stomach lining, gastrointestinal tract, lungs); the mesoderm (muscle, bone, blood, urogenital tissues); or ectoderm (epidermal tissues and nervous system).

The pluripotent stem cells derived from blastomeres cannot develop into a fetal or adult animal because they lack the potential to contribute to extraembryonic tissue, such as the placenta.

Totipotent (literally meaning “having all powers”) cells can develop as separate embryos. The zygote is considered totipotent because it will form both the foetal structures and the extraembryonic supporting structures. Totipotent stem cells can be derived from embryos that have not yet formed the trophoblast and can be induced to start dividing and developing as distinct embryos. This technique is called “blastomere separation” and is a form of cloning. It will be covered more fully in the section on cloning below.

The removal of one or more blastomeres from an embryo does not always cause the embryo’s death. This is often done as part of the process of pre-implantation genetic diagnosis in IVF.

Adult Stem Cells [20]

An adult stem cell is an undifferentiated cell found among differentiated cells in a tissue or organ, that can renew itself, and differentiate to yield the major specialized cell types of the tissue or organ. The primary roles of adult stem cells in a living organism are to maintain and repair the tissue in which they are found. Some scientists now use the term somatic stem cell instead of adult stem cell. Unlike embryonic stem cells, which are defined by their origin (the blastomeres of the inner cell mass of the blastocyst), the origin of adult stem cells in mature tissues is unknown.

Stem cells are thought to reside in a specific area of each tissue where they may remain quiescent (non-dividing) for many years until they are activated by disease or tissue injury. The adult tissues reported to contain stem cells include brain, bone marrow, peripheral blood, blood vessels, skeletal muscle, skin and liver.

Researchers are finding sources of adult stem cells in many more tissues than was once thought possible. This finding has led scientists to ask whether adult stem cells could be used for transplants. Certain kinds of adult stem cells seem to have the ability to differentiate into a number of different cell types, given the right conditions. If this differentiation of adult stem cells can be controlled in the laboratory, many researchers believe that these cells may become the basis of therapies for many serious common diseases and injuries.

In the 1960s, researchers discovered that the bone marrow contains at least two kinds of stem cells. One population, called hematopoietic stem cells, forms all the types of blood cells in the body. A second population, called bone marrow stromal cells, was discovered a few years later. Stromal cells are a mixed cell population that generates bone, cartilage, fat, and fibrous connective tissue.

[20] http://stemcells.nih.gov/info/basics/basics4.asp

Also in the 1960s, scientists discovered two regions of the brain that contained self-replicating cells which become nerve cells. By the 1990s scientists agreed that the adult brain contains stem cells able to generate the brain's three major cell types—astrocytes and oligodendrocytes, which are non-neuronal cells, and neurons, or nerve cells.

Since then the list of discoveries surrounding adult stem cell origins and their ability to form a wide variety of tissue types has grown almost daily. While embryonic stem cell research has yet to produce any actual therapeutic results, adult stem cells are becoming widely used in the treatment of numerous diseases and injuries and continue to yield promising experimental results related to many serious diseases.

Recent experiments have shown that certain adult stem cell types are pluripotent. The following list offers examples of adult stem cell plasticity that have been reported during the past few years:

- Hematopoietic stem cells may differentiate into: three major types of brain cells (neurons, oligodendrocytes, and astrocytes); skeletal muscle cells; cardiac muscle cells; and liver cells.
- Bone marrow stromal cells may differentiate into: cardiac muscle cells and skeletal muscle cells.
- Brain stem cells may differentiate into: blood cells and skeletal muscle cells.

Umbilical Cord Stem Cells [21]

Umbilical cords have traditionally been discarded as a by-product of the birth process. In recent years, however, the blood found in the umbilical cord has been found to be a rich source of multipotent stem cells, some of which have been found to have a plasticity approaching that of embryonic stem cells. Cord blood stem cells have yeilded therapeutic applications similar to those using bone marrow stem cells and peripheral

[21] Information in this section has been taken from the website of the University of Utah, Genetic Science Learning Center http://gslc.genetics.utah.edu/units/stemcells/sctoday/

blood stem cells. Private clinics are starting to be found around the world where clients can store umbilical cord blood as a preparation for possible future illness or accident.

Umbilical cord blood stem cell transplants are less prone to rejection than transplants from bone marrow cells. Because umbilical cord blood lacks well-developed immune cells, there is less chance that the recipient's body will attack the transplanted cells.

Peripheral Blood Stem Cell Transplants

A method of replacing blood-forming cells destroyed by cancer treatment. Stem cells found in the circulating blood, similar to those in the bone marrow, are screened, typically from the patient's own blood before treatment and replaced afterwards. This helps the bone marrow recover and continue producing healthy blood cells. Transplantation may be autologous (an individual's own blood cells saved earlier), allogeneic (blood cells donated by someone else), or syngeneic (blood cells donated by an identical twin).

During the research in the development of stem cell transplant therapies, it was discovered that bone marrow cells infused intravenously could repopulate the bone marrow and produce new blood cells. From this was developed a method of obtaining stem cells from a patient's blood.

Now, most hematopoeitic stem cell transplantation procedures are performed using stem cells collected from the peripheral blood, rather than from the bone marrow.

Other Uses of Stem Cells

In the section below, a few examples have been included showing recent breakthroughs and therapeutic applications of adult stem cells. These are only a tiny sampling of the hundreds of discoveries in the last ten years. Thus far, no successful application of embryonic stem cells have been found, although researchers continue to lobby heavily for their use in research.

Apart from use in treating diseases and injuries, human stem cells can also be used to test new drugs. New medications can be tested for safety on cells generated from human pluripotent (embryonic) cell lines that have been induced to differentiate into desired tissue types. Cell lines that are not derived from stem cells are already used in this way. Cancer cell lines, for example, are used to screen potential anti-tumor drugs.

Differentiation

Embryonic stem cells will remain undifferentiated as long as they remain isolated. If they are allowed to clump together they form “embryoid bodies” that begin to differentiate spontaneously and form various tissue types such as muscle cells, nerve cells, etc.

In order to obtain particular desired tissue types, scientists will change the chemical composition of the culture medium, alter the surface of the culture dish, or modify the cells by inserting specific genes. These techniques are referred to as “directed differentiation” the manipulation of stem cell culture conditions to induce differentiation into a particular cell type.

Immune System Rejection Problem

Tissue rejection occurs when the immune system of the recipient of a tissue transplant attacks the transplanted organ or tissue. This is because a normal healthy human immune system can distinguish foreign tissues and attempts to destroy them, just as it attempts to destroy infective organisms such as bacteria and viruses.

In conventional transplants with donated organs, immune supressant drugs must be taken by the recipeint indefinitely to suppress the body’s attempt to destroy the implanted organ. In stem cell applications, the immune system problem is especially acute in attempts to use embryonic stem cells, tissue derived from another person, directly in therapeutic applications.

One of the most important advantages of adult stem cell therapies is that the tissue involved comes from the patient's own body, circumventing immune system rejection problems.

Key questions in Ongoing Research

The NIH website lists a number of important questions about adult stem cells researchers are currently exploring:

- How many kinds of adult stem cells exist, and in which tissues do they exist?
- What are the sources of adult stem cells in the body? Are they "leftover" embryonic stem cells, or do they arise in some other way? Why do they remain in an undifferentiated state when all the cells around them have differentiated?
- Do adult stem cells normally exhibit plasticity, or do they only transdifferentiate when scientists manipulate them experimentally? What are the signals that regulate the proliferation and differentiation of stem cells that demonstrate plasticity?
- Is it possible to manipulate adult stem cells to enhance their proliferation so that sufficient tissue for transplants can be produced?
- Does a single type of stem cell exist—possibly in the bone marrow or circulating in the blood—that can generate the cells of any organ or tissue?
- What are the factors that stimulate stem cells to relocate to sites of injury or damage?
- What are the factors that stimulate stem cell proliferation in the body's tissues?

Some Recent Therapeutic Applications and Experimental Results with Adult Stem Cells[22]

February 2005 [23]: A research team led by University of Central Florida professor Kiminobu Sugaya has discovered a compound related to DNA that could improve the results of stem cell treatments for Alzheimer's patients. The research team found that treating bone marrow cells with the compound made adult stem cells more likely to turn into brain cells in experiments with rats.

February 2006 [24]: 48 people diagnosed with the autoimmune condition known as systemic lupus erythematosus (lupus) received an experimental therapy from Chicago's Northwestern Memorial Hospital, using a stem-cell transplant from their own bone marrow. At the time of the report, thirty-three of the patients treatment remained in complete remission.

November 2006 [25]: Newcastle University researchers Nico Forraz and Colin McGuckin grew 'mini-livers' using stem cells obtained from umbilical cord blood. The tissue is capable of being used to test new drugs and, in future years, of providing life-saving treatment to patients in need of liver transplants.

November 2006 [26]: University College London Hospital, St. Bartholomew's and the London NHS will treat heart attack victims with an injection of adult bone marrow stem cell treatment. Patients suffering a heart attack will undergo regular treatment of an angioplasty to remove blockage to an artery, and then will receive an injection into the

[22] The following examples have been taken from the archives of LifeSiteNews.com. Since the late 1990's, LifeSiteNews.com has been recording countless instances of theraputic uses and experimental breakthroughs of adult stem cells, many of which were not reported or were underreported in the mainstream media. Vastly more information than can be recorded in this document is available at http://www.lifesite.net/ . Type the key words "adult stem cells" into the site's search engine.

[23] http://www.lifesite.net/ldn/2005/feb/05021405.html

[24] http://www.lifesite.net/ldn/2006/feb/06020206.html

[25] http://www.lifesite.net/ldn/2006/nov/06110105.html

[26] http://www.lifesite.net/ldn/2006/nov/06110809.html

artery of stem cells harvested from the bone marrow in their hip, under local anesthetic. The treatment has shown remarkable success in growing heart tissue, in trials in other countries. Doctors hope the technique will lead to repairing damaged heart muscles and preventing further attacks and the development of heart failure.

January 2007 [27]**:** Researchers in New York have successfully generated new tooth roots and supporting ligaments in pigs, using human adult stem cells taken from extracted wisdom teeth. The regenerated tooth was used to support a crown restoration in miniature pigs, Reuters reported. The tooth exhibited the same functional and strength characteristics of the original tooth.

February 2007 [28]**:** Dr. Francisco Fernandez-Aviles, Professor of Cardiovascular Medicine and Chief of Cardiology Service at Gregorio Marañón and Dr. Perin, Director of New Interventional Cardiovascular Technology and Director of Stem Cell Center at the Texas Heart Institute at St. Luke's Hospital, used human adipose (fat) tissue as a source of adult stem cells to regenerate damaged heart muscle. After processing, the stem cells were injected directly into the patient's heart, targeting areas of damaged but still viable tissue.

"This is the first time we have used adipose-derived stem cells in humans. We had good results in our pre-clinical tests and we are excited about taking this research to the next level," said Dr. Perin.

April 2007 [29]**:** A man's vision was restored by a corneal patch grown from his own stem cells by a team at the University of Melbourne's Centre for Eye Research Australia (CERA) and the Bernard O'Brien Institute of Microsurgery (BOBIM).

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[27] http://www.lifesite.net/ldn/2007/jan/07010502.html

[28] http://www.lifesite.net/ldn/2007/feb/07020903.html

[29] http://www.lifesite.net/ldn/2007/apr/07041803.html

May 2007 [30]**:** Researchers at the University of Texas engineered adult stem cells derived from human umbilical cord blood to produce insulin. Published in the June 2007 issue of the medical journal Cell Proliferation, the paper calls it "the first demonstration that human umbilical cord blood-derived stem cells can be engineered" to synthesize insulin. "This discovery tells us that we have the potential to produce insulin from adult stem cells to help people with diabetes," said Dr. Randall J. Urban, senior author of the paper, professor and chair of internal medicine at the University of Texas Medical Branch at Galveston and director of UTMB's Nelda C.

[30] http://www.lifesite.net/ldn/2007/may/07052809.html

Part I: A brief description of the Early Life Issues

4. Cloning

The term “cloning” is not specific to one biological process but collectively refers to any process used to create copies of another organism, cell or tissue. Cloning can include the creation of identical DNA fragments (molecular cloning), cells (cell cloning), or whole organisms. It is the last with which this document is largely concerned.

In recent years, the media has almost exclusively referred to a single method of cloning whole organisms, somatic cell nuclear transfer, (SCNT), which has become synonymous in the public mind with cloning, an error that has found its way into legislation around the world.

The SCNT method was made famous by the creation, in March 1996, of “Dolly” the sheep by a team of scientists at the Roslin Institute in Edinburgh, Scotland, led by Dr. Ian Wilmut. Dolly, a Finn Dorset breed sheep, was the first cloned mammal to be brought to adulthood. She suffered some genetic abnormalities and died much earlier than is usual for a sheep of that breed, on February 14, 2003.

From the time of Dolly’s creation, the media has used the terms “cloning” and SCNT interchangeably, creating much confusion in the public and in various attempts to regulate or ban human cloning around the world.

In Canada, so ingrained was the idea that “cloning = SCNT”, that neither pro-life activists nor embryologists nor experts in bioethics were able to clarify to parliamentarians the linguistic problems of legislation proposing to regulate artificial procreation, embryo research and cloning. Critics of the bill insisted that any attempt to ban or restrict human cloning must accurately reflect the scientific realities of the field. These experts cautioned that the bill was riddled with inaccurate terms and therefore that its prohbition on cloning would prove ineffective.

The government's Assisted Human Reproduction act passed in the House of Commons without significant amendments in October, 2003. It was passed unanimously in the Senate in signed into law in March 2004.

In the Canadian legislation, as with may others worldwide, the term "cloning" is defined only as Somatic Cell Nuclear Transfer, despite there being many different methods of creating a cloned cell or organism.

What is a Clone?

The group of definitions given below are subject to change given new information. They have been developed by Dr. Dianne Irving, PhD[31], with the purpose of clarifying common misunderstandings of the nature of human cloning research. They were developed from internationally recognized human embryology text books using standard scientific nomenclature.

- **Human being:** any organism who begins to exist immediately by means of sexual or a-sexual reproduction and who possesses a genome specific for and consistent with an individual member of the human species.

- **Human genome:** The total nuclear and cytoplasmic DNA genetic materials that constitute an organism as an individual member of the human species.

- **Cloning:** the duplication, or near-duplication, of molecules, any part(s) of a cell, a single cell, cells, tissues, organs, or organisms using any cloning technique.

- **Cloning techniques:** any technique used to duplicate, or to near-duplicate, molecules, part(s) of a cell, a single cell, cells, tissues, organs, or organisms.

[31] Dr. Dianne Irving PhD a scientist and a philosopher, was in the first graduating class at The Kennedy Institute Of Ethics at Georgetown University. See Part V: Resources; Section 3. Prominent Figures in the Early Life Issues.

- **Human cloning:** (a) organism: the duplication, or near-duplication, of a whole human being using any cloning technique; or, the use of part(s) of human cellular or artificial materials for the purpose of duplicating a whole human being using any technique; (b) molecules: permanently altering the human genome in successive reproductive generations by means of the duplication, or near duplication, of human genetic materials using any a-sexual reproductive technique and/or any sexual reproductive technique.

- **Cloned human being:** A human being at any stage of development who is a-sexually reproduced using any cloning technique.

These definitions cover some of the cloning that are currently being used, e.g., human cloning by means of "twinning" (blastomere separation and blastocyst splitting), somatic cell nuclear transfer (SCNT), germ line cell nuclear transfer (GLCNT), pronuclear transfer, mitochondrial transfer, and germ line gene transfer. They attempt to anticipate the near future use of legislation to cover advances in nanotechnology, (e.g., the artificial construction of parts of human cells, human cells, tissues, organs, and organisms starting with nano-molecules, etc.; this technology is in current development and the proposed legislation in New Zealand allows for the use of artificially constructed sperm and oocytes but does not specify the methods that may be used.) -- and in bioengineering and genetic engineering.

A Variety of Methods

Somatic Cell Nuclear Transfer: In SCNT the nucleus of an oocyte is removed and replaced with that of a somatic[32] cell (a cell that is not either a male or female gamete). After being inserted into the oocyte, the somatic cell nucleus is reprogrammed by the host cell. The resulting single-cell embryo is stimulated and will begin to divide and develop. After many mitotic divisions in culture, this single cell forms a blastocyst with almost identical DNA to the original organism.

[32] Somatic cell: any cell forming the body of an organism. The word "somatic" is derived from the Greek word sōma (σώμα), meaning "body".

Contrary to the popular conception, this technique does not create an exact genetic copy of the donor of the somatic cell since mitchondrial DNA is found in the enucleated oocyte that was not part of the nucleus. The resulting organism therefore, carries DNA from both the original oocyte and the donor of the nuclear DNA.

Pronuclear Transfer: Pronuclear Transfer is a form of a-sexual reproduction (cloning) in which male and/or female pronuclei[33] are transferred from one or more embryos to an enucleated oocyte. After electrical or chemical stimulation, the pronuclei merge, producing a new human embryo with 46 (or more) chromosomes. The extra female chromosomes which were initially ejected in a polar body from the oocyte during fertilization can also be "captured" and used as a female pronucleus in cloning.

In the ordinary process of fertilization, the oocyte ("ovum") is at first diploid, that is it contains the full complement of 46 chromosomes, the normal number for any cell of a member of the human species.

When a sperm penetrates an oocyte, the 46 female chromosomes of the oocyte are reduced to 23. In this process, the extra 23 female chromosomes are extruded or ejected from the organism in a "polar body."[34] The embryo now contains 23 male and 23 female chromosomes (the correct number for an individual member of the human species).

At first, after the sperm has penetrated the membranes of the oocyte, the male and female chromosomes are separately encased in a molecular aggregate called a "pronucleus"; each containing 23 chromosomes. Each pronucleus can be manipulated, isolated and removed from the newly fertilized embryo – a technique refined for years for IVF research.

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[33] Pronucleus: a molecular aggregate created from the haploid nuclei of sperm and oocyte at fertilization but before fusion; each contains 23 chromosomes.

[34] The polar body can also be combined with pronuclei to create chimeric embryos. This is also a form of cloning.

This is a method that could be used to produce human/human chimeras (male and female pronuclei transferred from more than one human embryo), and human/animal chimeras.

Mitochondrial Transfer: “Mitochondrial Transfer” is an a-sexual form of manipulation of an embryo (cloning) in which the mitochondria (containing mitochondrial DNA) from a human donor female oocyte are transferred to another human female oocyte, or to a newly produced human embryo.

Every human cell contains small organelles that are found in the cytoplasm of the cell, outside of the nucleus. One kind of these organelles is called a mitochondrion, which contain human genetic material (DNA) – or “mDNA” (for “mitochondrial DNA”). Mitochondria are primarily concerned with energy production for the rest of the cell. Although the amount of mDNA is small compared to the nuclear DNA in the cell nucleus, small errors in mDNA can cause serious, even lethal, human diseases that are passed on by the mother’s oocyte during fertilization. One method of attempting to correct this genetic defect is to transfer healthy mitochondria from a donor oocyte into the diseased oocyte, or into a new human embryo reproduced with the diseased oocyte

This new human embryo would contain human genetic material (DNA) from more than one female and from one male, and the “foreign” mitochondrial DNA would continue to be replicated (cloned) with each new cell of the developing human being, including his/her own germ line (reproductive) cells. Thus the initial “foreign” mitochondrial DNA could be cloned throughout successive generations.

DNA-Recombinant Germ Line Gene Transfer: The injection of “foreign” DNA or genes into cells or embryos – “gene transfer” – can be used for “enhancement” or for “corrective” purposes. This is a form of eugenics, the effort to “improve” the human race by eliminating unwanted characteristics, or, as in the case of DNA Recombinant Germ

Line Gene Transfer, by direct manipulation of the genetic make-up of successive generations of human beings.

It is accomplished by means of a "vector" or carrier, often a virus, into which the "foreign" gene is first inserted and which then "recombines" with the vector's own genetic material. This vector, now containing the "foreign" gene, is then transferred into a germ line cell (male or female) of a patient.

The germ line cells of that patient will incorporate the "foreign" gene into its own DNA. When that patient later takes part in sexual reproduction, the "foreign" gene will be transferred again by being incorporated into the new human embryo's own germ line cells.

Alternatively, the "foreign" gene in the vector can be transferred into a newly fertilized human embryo and thus be incorporated into the new embryo's germ line cells. In either case, as the human embryo's cells divide during growth and development, the "foreign" gene will likewise be incorporated into every cell of the growing embryo, including the new embryo's own germ line cells. Therefore, when that human being matures and reproduces sexually, his/her descendants will also possess the "foreign" gene. Thus the "foreign" gene will be passed on throughout successive generations.

Blastomere separation (twinning): See Part I, Section 2. What are New Reproductive Technologies? Pg. 7

Altered Nuclear Transfer: In 2004, a controversy arose when Dr. William Hurlbut[35] a member of the President's Council on Bioethics, made a presenation[36] suggesting a

[35] Dr. William Hurlbut: a physician and Consulting Professor in the Neuroscience Institute at Stanford, Stanford University Medical Center. He currently serves on the President's Council on Bioethics. See Part V: Resources; Section 3. Prominent Figures in the Early Life Issues.

[36] Dr. Hurlbut's commissioned working paper for the Council, titled, "Altered Nuclear Transfer as a Morally Acceptable Means for the Procurement of Human Embryonic Stem Cells," was discussed in December 2004. http://www.bioethics.gov/background/hurlbut.html

method called “Altered Nuclear Transfer” that he claimed would enable scientists to obtain embryonic stem cells without the creation of embryos.

He proposed the creation of life forms made from human oocytes and injected DNA that he termed “biological artifacts”. These would be capable of producing embryonic or embryonic-like stem cells, without the entity containing enough of a human genome to qualify as embryos, and therefore as persons. Hurlbut concluded that these “biological artifacts” could circumvent the ethical problem of killing embryonic human beings to obtain stem cells.

Hurlbut’s proposal was based on research by Rudolf Jaenisch a Professor of Biology at MIT and a pioneer in transgenic[37] science. Jaenisch isloated embryonic stem cells from what he called an “embryo-like entity” that was genetically incapable of implanting in a uterus, and that also had certain structural deficiencies. ANT uses the technology of nuclear transfer, but using a donor cell with an altered nucleus.

Dr. Hurlbut stated:

> *The resulting biological entity, while being a source of pluripotent stem cells, would lack the essential attributes and capacities of a human embryo. For example, the altered nucleus might be engineered to lack a gene or genes that are crucial for the cell-to-cell signaling and integrated organization essential for (normal) embryogenesis. It would therefore lack organized development from the very earliest stages of cell differentiation. Such an entity would be a 'biological artifact,' not an organism.*

He said, “Even if they're human - without that principle of life, are not moral entities.”

Possibly due to the extremely rarified nature of the technical language, few reservations were raised at the meeting, and the proposal gained support even among pro-life advocates.

[37] Transgenic: in recombinant DNA technology DNA molecules from different sources are combined in vitro to one molecule to create a new gene. This modified DNA is then transferred into an organism causing the expression of modified or novel traits. The product is also known as an Genetically Engineered Organism or GEO.

American Life League[38] responded that the proposal would indeed create embryos that were merely genetically modified to make them severely disabled. "While the experiment was successful in producing embryonic stem cells, it did so by producing disabled embryos. The original proposal envisioned the creation of entities without any developmental direction or organization; yet those created in this experiment were able to develop to the blastocyst stage before the genetic engineering resulted in their death."

Dr. Clem Persaud, a retired Professor of Microbiology and Biotechnology, called[39] the proposal "deeply flawed." He said that the process would not create an unknown new entity, but a severely disabled, cloned human being. "The process amounts to a kind of germ-line genetic engineering combined with a type of cloning to produce an aberrant human embryo. Deliberately producing a deformed human being, then destroying it to harness stem cells is morally repugnant, and is a clear case of ends justifying means."[40]

Parthenogenesis: A form of asexual reproduction where an embryo develops without the fusion of sperm with the oocyte. Parthenogenesis occurs naturally in some species, including lower plants, invertebrates (e.g. water fleas, aphids, some bees and parasitic wasps), and vertebrates (e.g. some reptiles, fish, and, very rarely, birds and sharks). Some scientists have proposed artificially inducing parthenogenesis with human oocytes as a means to obtain stem cells without fertilization. It is sometimes also used to describe reproduction modes in hermaphroditic species which can self-fertilize.

Chimera: a single individual that is a combination of two or more fused embryos or parts of embryos. Chimeras are formed from three or four parent cells (an embryo is fused with an unfertilized oocyte or an embryo is fused with an extra sperm). Each population of cells keeps its own character and the resulting animal is a mixture of mis-

[38] http://www.lifesite.net/ldn/2006/jul/060714a.html
[39] http://www.lifesite.net/ldn/2004/dec/04121604.html

[40] See also Part II: The Ethics of the Early Life Issues, on the so-called "rustling bush" problem.

matched parts. An analogy is two jigsaw puzzles cut using an identical cutter, but with different pictures. A single puzzle can be made out of the mis-matched parts, but the completed puzzle will show parts of both different pictures.

Mosaic: or mosaicism, denotes the presence of two populations of cells with different genotypes in one individual, who has developed from a single fertilized egg. Mosaicism may result from a mutation during development which is propagated to only a subset of the adult cells.

Although the two can have some common charateristics, mosaicism is distinct from chimerism. In the latter, the two or more genotypes arise from more than one zygote, while in mosaics, these genotypes arise from only a single cell.

Part I: A brief Description of the Early Life Issues

5. An IVF, Cloning and Stem Cell Timeline[41]

Some major events since the discovery of stem cells

1963 - Canada - McCulloch and Till illustrate the presence of self-renewing cells in mouse bone marrow.

1967 - Abortion legalised in Britain.

1968 - Bone marrow transplant between two siblings successfully treats Severe Combined Immunodeficiency (SCIDS- also known as 'bubble-boy' disease.)

1969 - Abortion conditionally legalised in Canada.

1978 -United Kingdom: Louise Brown is born, promoted by the IVF industry as the "first test-tube baby." In fact, Louise was the only child to be conceived by the in vitro procedure who survived to birth of nearly 80 previous attempts.

1978 - British government sets up the Warnock committee in the wake of the controversy over Louise Brown's conception, to investigate IVF and embryo research, and to make recommendations for legislation.

1978 - Haematopoietic stem cells are discovered in human cord blood.

1981 - Mouse embryonic stem cells are derived from the inner cell mass.

1991 - United Kingdom: Passage of the Human Fertilisation and Embryology Act, establishes Human Fertilisation and Embryology Authority (HFEA).

[41] http://en.wikipedia.org/wiki/Stem_cells

1991-2007 - HFEA issues series of permissions for experiments on live human test subjects, at the embryonic stage and often created in the lab for the purpose, or donated from “spare” embryos left over from in vitro fertilisation. These include cloning; eugenic screening and destruction of embryos for potential defects; the creation of embryos for sibling tissue match treatments; the combining of human and animal DNA to create “hybrid” or “chimeric” embryos.

1992 - Neural stem cells are cultured in vitro as neurospheres.

1993 - Canada’s Royal Commission on New Reproductive Technologies recommends the creation of a matching regulatory body for Canada.

1995 - U.S. President Bill Clinton signs into law the Dickey Amendment which prohibited federally appropriated funds to be used for research where human embryos would be either created or destroyed.

1997 - Leukemia is shown to originate from a haematopoietic stem cell, the first direct evidence for cancer stem cells.

1998 - James Thomson and coworkers derive the first human embryonic stem cell line at the University of Wisconsin-Madison.

2000 - French researchers report in Science what the call the first clear success in human gene therapy, curing severe combined immunodeficiency disease (SCID) in several children by inserting the missing gene into their bone marrow stem cells.

2000- Costa Rica: the highest constitutional court outlaws IVF because of the loss of life involved. The court declared that “the human embryo is a person from the moment of conception ... not an object” and rules that any form of IVF exposes embryos to “disproportionate risk of death”.

2003 - Dr. Songtao Shi of NIH discovers new source of adult stem cells in children's primary teeth.

2004 - The government of Italy makes it a crime to freeze human embryos or to perform preimplantation diagnosis.

2004 - California voters approve Proposition 71, which provides $3 billion in state funds over ten years to human embryonic stem cell research.

2004 - Canadian Liberal government passes An Act Respecting Assisted Human Reproduction and Related Research, legalising and regulating IVF and related activities including research on embryos.

2005 - Researchers at Kingston University in England claim to have discovered a third category of stem cell, dubbed cord-blood-derived embryonic-like stem cells (CBEs), derived from umbilical cord blood. The group claims these cells are able to differentiate into more types of tissue than adult stem cells.

2004-2005 - Korean researcher Hwang Woo-Suk claims to have created several human embryonic stem cell lines from unfertilised human oocytes. The lines were later shown to be fabricated.

2001-2006 - U.S. President George W. Bush endorses the Congress in providing federal funding for embryonic stem cell research of approximately $100 million as well as $250 million dollars for research on adult and animal stem cells. He also enacts laws that restrict federally-funded stem cell research on embryonic stem cells to the already derived cell lines.

2004 - Dr. William Hurlbut proposes “Altered Nuclear Transfer” to the President’s Council on Bioethics. He claims it is a method of acquiring embryonic stem cells without

killing embryos. His claim is rejected by some pro-life organisations and accepted by others.

2006 - Senator Rick Santorum introduces bill number S. 2754, or the Alternative Pluripotent Stem Cell Therapies Enhancement Act. into the U.S. Senate.

2006 - The U.S. Senate passes the Stem Cell Research Enhancement Act H.R. 810, and votes down Senator Santorum's S.2754.

2006 - President George W. Bush vetoes H.R. 810 (Stem Cell Research Enhancement Act), a bill that would have reversed the Clinton-era law which made it illegal for Federal money to be used for research where stem cells are derived from the destruction of an embryo.

2006 - Cell Journal publishes Kazutoshi Takahashi and Shinya Yamanaka, Induction of Pluripotent Stem Cells from Mouse Embryonic and Adult Fibroblast Cultures by Defined Factors.

2006 - The people of the U.S. state of Missouri passed Amendment 2, which allows usage of any stem cell research and therapy allowed under federal law, but prohibits human reproductive cloning.

2007 - Scientists at Wake Forest University led by Dr. Anthony Atala and Harvard University report discovery of a new type of stem cell in amniotic fluid. This may potentially provide an alternative to embryonic stem cells for use in research and therapy.

2007 The California Institute for Regenerative Medicine became the biggest financial backer of human embryonic stem cell research in the United States when they awarded nearly $45 million in research grants.

2007 - Research reported by three different groups shows that normal skin cells can be reprogrammed to an embryonic state in mice.

2007 Scientist Shoukhrat Mitalipov reports the first successful creation of a primate stem cell line through somatic cell nuclear transfer.

2007 – UK Labour government introduces draft legislation that codifies the HFEA's previous individual permissions.

Part II: The Ethics of the Early Life Issues

1. What is "Ethics"?

This section[42] can serve as a mini-course in some basic ideas in the philosophy of ethics, developments that have led to the current situation in the life issues, and terminology.

The situation around the world that became apparent with the advent of legalized abortion did not occur randomly but was the logical outcome of certain trends in philosophy that began, some contend, as far back as 17th century France, Germany and England. The replacement of traditional, Natural Law-based philosophies and ethics with a new, subjective[43] and relativistic model of ethics began recognizably with the advent of the humanist movement in the 17th century.

The clash between the traditional system of thought and the new is the basis of a state of philosophical and social instability, often referred to as "the Culture Wars," of which the life issues form perhaps the most significant front. The split in this war is, loosely described, between "liberals" who want greater relaxation of traditional legal restraints on sexual and other behavior, and "conservatives" who believe that society has a right and a duty to maintain laws restricting the private behavior of citizens.

But more profoundly, the true philosophical and ethical split of the Culture War is that between traditional objective[44] moral laws, and the imposition of the new subjectivism as the criterion for morality. The difference is between "I ought," and "I would prefer."

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[42] Much of this section is based on the relevant entries in the Cambridge Dictionary of Philosophy (CDP), 2nd ed. Cambridge University Press, 1999

[43] Subjectivity: belonging to, of, due to the consciousness of thinking or perceiving subject or ego. As opposed to real or external things; giving prominence to or depending on personal idiosyncrasy or individual point of view.

[44] Objectivity: external to the mind, real; dealing with outward things and not with thoughts or feelings, exhibiting actual facts uncoloured by exhibitor's feelings or opinions. (Concise Oxford Dictionary, 3rd edition. Oxford University Press, 1938)

Establishing what is and is not ethical is not so straightforward in our current state of vast philosophical flux. There are a number of different schools of thought – of philosophical presuppositions[45] – currently in vogue and they, naturally, produce a different set of conclusions in ethical questions. It stands to reason, therefore, that our ethical situation is chaotic.

A basic familiarity with these ideas is absolutely crucial for making a coherent argument for the pro-life position on abortion, embryonic research, cloning and NRT's.

Ethics vs. Morality

In the minds of most people, ethics and morality are, if not interchangeable terms, deeply dependent upon each other. An ethical system that is not based on generally accepted moral norms is one that most people would have difficulty grasping. The assumption that "ethicists" are working from the same moral framework as that of the general public has allowed a host of practices that would traditionally be regarded as grossly immoral, to become shielded and championed by professional ethicists. A distinction must be made, therefore, between ethics and morality if the current problems are to be understood, since in contemporary professional ethics circles the moral principles upon which decisions are being made are vastly divergent from what is traditionally understood by most as "moral".

Ethics, strictly understood in philosophy, is the application of any given philosophical system to answer moral questions, i.e.: May we do a given act? Is the act in question acceptable?

The Cambridge Dictionary of Philosophy (CDP), gives the following definition of ethics[46]: *"The philosophical study of morality… Ethics, along with logic[47], metaphysics[48] and*

[45] See Part II section 2. "The New Subjectivism – Some Examples"

[46] CDP p. 284, "Ethics"

[47] Logic: the study of the principles and criteria of valid inference and demonstration. Logic is the basic unit of rational thought and the means by which ideas are made to conform to objective reality. As a

epistemology[49] is one of the main branches of philosophy…Its principal, substantive questions are what ends we ought, as fully rational beings, to choose and pursue and what moral principles should govern our choices and pursuits."

"Morality" is given as *"an informal public system applying to all rational persons, governing behavior that affects others, having the lessening of evil or harm as its goal, and including what are commonly known as the moral rules, moral ideals, and moral virtues.[50]"*

Ethics and the Natural Law

The Natural Law philosophy, upon which Judeo-Christian moral laws are based, asserts that knowledge of an objectively immutable and rational moral law is possible within human nature and that, therefore, only those ethical choices that conform to that immutable law are rational and good and in conformity to human nature.

The CDP defines the Natural Law as, "in moral and political philosophy, an objective norm or set of objective norms governing human behavior, similar to the positive laws of a human ruler, but binding on all people alike and usually understood as involving a superhuman legislator [God].[51]"

The Natural Law philosophy is not limited to Christian culture and does not necessarily require a belief in a divine legislator. In fact, the legal principles upon which the universal prohibition against, for example, murder, were laid down by Roman

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formal science, logic investigates and classifies the structure of statements and arguments, both through the study of formal systems of inference and through the study of arguments in natural language.

[48] Metaphysics: the branch of philosophy concerned with explaining the ultimate nature of reality, being, and the world.

[49] Epistemology: theory of knowledge is the branch of philosophy that studies the nature, methods, limitations, and validity of knowledge and belief.

[50] CDP p. 586, "Morality"

[51] CDP: p. 599. "Natural Law".

jurispridence well before the birth of Christ, and were themselves based on earlier philosophical developments by the Greeks as early as the 5th century BC.

> [52]*"Ancient Greek and Roman thought, particularly Stoicism,[53] introduced ideas of eternal laws directing the actions of all rational beings and built into the very structure of the universe. Roman lawyers developed a doctrine of a law that all civilized peoples would recognize, and made some effort to explain it in terms of a natural law common to animals and humans.*
>
> *The most influential forms of natural law theory, however, arose from later efforts to use Stoic and legal language to work out a Christian theory of morality and politics. The aim was to show that the principles of morals could be known by reason alone, without revelation[54], so that the whole human race could know how to live properly."*

When a person holds, or assumes unconsciously, these classical philosophical positions, the question: "Is it wrong to take an innocent human life?" poses no difficulty. But since the advent of the new philosophical systems, which will be described below, the question becomes a matter for deliberations in applied ethics.

A danger arises when it is assumed by those making the pro-life case that "ethical" and "moral" are synonymous according to the traditional Judeo-Christian understanding. In our time, what is called "ethical" is frequently entirely unrelated to the objective moral norms familiar to most people. This failure to understand the radical difference in thought between the traditional Natural Law philosophies and the new theories has been a major obstacle to communicating our ideas.

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[52] CDP: p. 599. "Natural Law".

[53] Stoicism: a school of Hellenistic (Ancient Greek) philosophy, that teaches the development of self-control, fortitude and detachment from distracting emotions, sometimes interpreted as an indifference to pleasure or pain, allowing one to become a clear thinker, level-headed and unbiased.

[54] "revelation": direct intervention in human knowledge by God or a supernatural being.

The Clash of Modernity

Western society has experienced a huge transition in the last hundred years in which the objective norms of the Natural Law have largely been supplanted as the accepted philosophical foundation in our public institutions by a system of subjective, relativistic ideas.

The confusion in the ethics surrounding the early life issues, comes from this rapidly widening gulf that has grown between what most adult people – still largely unconsciously functioning on the previous objective moral assumptions – understand to be "moral" and what academia, the medical community, media and governments, assert is "ethical."

That it has become necessary for the last four decades to reassert the traditional answer to the question: "Is it wrong to take an innocent human life?" shows that this confusion is profound indeed.

This gulf has been the cause of much confusion in the public mind about the moral nature of the new reproductive technologies. Hospitals, legislatures, government regulators, and distributors of public funds for research often do not operate on the same philosophical foundation for answering the ethical questions as most of the general public. When these institutions, as they often do, assure the public that the research approved for public funding has passed the examination of the "ethics experts," the result is often something profoundly at odds with what most people, if they understood what was being proposed, would approve.

For example, when the "average person" is asked whether abortion ought to be restricted in some way, public opinion polls invariably show that he almost always answers from his foundational assumptions about right and wrong: yes. But in Canada, this opinion of the common man is largely ignored by our country's governing elites as an outmoded system of thought. The result is that abortion has no legal restrictions and

this situation is approved by academic experts in ethics but is vastly disapproved by the public.

Under the “new dispensation” of widely accepted – but often not openly acknowledged – subjective philosophical norms, unrestricted legal abortion, as well as experimental human cloning, in vitro fertilisation and embryonic stem cell research *et al*, are “ethical” even while they clash radically with the generally accepted moral law.

Moreover, adherence to this new dispensation of norms has been heavily inculcated into the school curricula and the media, and such views are often uncritically held by Canada’s younger generation.

Part II: The Ethics of the Early Life Issues

2. The New Subjectivism - Some Examples

If the philosophical landscape has changed so dramatically, upon precisely what philosophical premises are these new ethical norms founded? And how do they differ from the Natural Law philosophies?

This section gives brief definitions of the various schools of thought that have given rise to the current legislative and ethical situation with regard new reproductive technologies and related research[55].

Anti-Realism [56]**:** Rejection, in one or another form or area of inquiry, of realism, the view that there are knowable mind-dependent facts, objects, or properties. Metaphysical realists make the general claim that there is a world of mind-independent objects [objective reality]. Realists in particular areas make more specific or limited claims. Thus moral realists hold that there are mind-independent moral properties, mathematical realists that there are mind-independent mathematical facts…[etc]. Anti-realists deny either that facts of the relevant sort are mind-independent or that knowledge of such facts is possible [57].

Ethical Constructivism [58]**:** A form of anti-realism about ethics which holds that there are moral facts and truths, but insists that these facts and truths are in some way constituted by or dependent on our moral beliefs, reactions, or attitudes…Moral relativism is a constructivist view that allows for a plurality of moral facts and truths.

[55] The definitions are taken from the Cambridge Dictionary of Philosophy, 2nd Edition, 1999.

[56] CDP pg. 33 “Anti-Realism”

[57] cf. Descartes “Cogito ergo sum” “I think therefore I am”, as the only knowable fact.

[58] CDP pg. 283 “Ethical Constructivism”

Postmodernism [59]**:** Is…regarded as a complex cluster concept that includes the following elements: an anti- (or post-) epistomological standpoint; anti-essentialism; anti-realism; anti-foundationalism; opposition to transcendental arguments and transcendental standpoints; rejection of the picture of truth as correspondence to reality; rejection of the very idea of canonical descriptions; rejection of final vocabularies; i.e., rejection of principles, distinctions, and descriptions that are thought to be unconditionally binding for all times, persons, and places.

Relativism [60]**:** The denial that there are certain kinds of universal truths. There are two main types, *cognitive,* and *ethical.* Cognitive relativism holds that there are no universal truths about the world: the world has no intrinsic characteristics, there are just different ways of interpreting it[61]… [Philosopher Richard] Rorty says, e.g. That "'Objective truth' is no more and no less than the best idea we currently have about how to explain what is going on." Critics of cognitive relativism contend that it is self-referentially incoherent, since it presents its statements as universally true [i.e. It is presented as a "fact" that there are no facts], rather than relatively so.

Ethical relativism is the theory that there are no universally valid moral principles: all moral principles are valid relative to culture or individual choice … Subjectivism … maintains that individual choices are what determine the validity of a moral principle. Its motto is 'Morality lies in the eyes of the beholder."…The opposite of ethical relativism is ethical objectivism, which asserts that although cultures may differ in their moral principles, some moral principles have universal validity. Even if e.g. a culture does not recognize a duty to refrain from gratuitous harm, that principle is valid and the culture should adhere to it.

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[59] CDP pg. 725 "Postmodern"

[60] CDP pg. 790 "Relativism, ethical"

[61] The argument about the nature of the unborn has been guided by cognitive relativism. Many abortion advocates will insist, along with bioethicists in favour of cloning, that the nature of a child or embryo or clone changes according to the desires or beliefs of observers, creators, donors or legislatures. It is commonly argued that an IVF embryo is a "child" if it is wanted by a couple, and only a "pre-embryo" or "medical research material" if it is not. Legislation often reflects this attitude.

Situation Ethics [62]**:** A kind of anti-theoretical, case-by-case applied ethics in vogue largely in some European and American religious circles for twenty years or so following World War II. It is characterized by the insistence that each moral choice must be determined by one's particular context or situation – i.e.: by a consideration of the outcomes that various possible courses of action might have, given one's situation. To that degree, situation ethics has affinities to both act utilitarianism and traditional casuistry. But in contrast to utilitarianism, situation ethics rejects the idea that there are universal or even fixed moral principles beyond various indeterminate commitments or ideals (e.g., to Christian love or humanism). In contrast to traditional casuistry, it rejects the effort to construct general guidelines from a case or to classify the salient features of a case so that it can be used as a precedent. The anti-theoretical stance of situation ethics is so thoroughgoing that writers identified with the position have not carefully described its connections to consequentialism, existentialism, intuitionism, personalism, pragmatism, relativism, or any other developed philosophical view to which it appears to have some affinity.

Social Constructivism [63]**:** Any of a variety of views which claim that knowledge in some area is the product of our social practices and institutions, or of the interaction and negotiations between relevant social groups. Mild versions hold that social factors shape interpretations of the world. Stronger versions maintain that the world, or some significant portion of it, is somehow constituted by theories, practices, and institutions. Defenders often move from mild to stronger versions by insisting that the world is accessible to us only through our interpretations, and that the idea of an independent reality is at best an irrelevant abstraction and at worst incoherent.

[62] CDP pg. 846 "Situation Ethics"

[63] CDP pg. 855 "Social Constructivism"

Utilitarianism[64]**:** The moral theory that an action is morally right if and only if it produces at least as much good (utility) for a all people affected by the action as any alternative action the person could do instead. Its best-known proponent is John Stuart Mill,[65] who formulated the greatest happiness principle (also called the principle of utility): always act so as to produce the greatest happiness…Most debate about utilitarianism has focused on its moral implications. Critics have argued that its implications sharply conflict with most people's considered moral judgments, and that this is a strong reason to reject [it]…Utilitarianism requires, in individual actions and in public policy, maximizing utility [happiness or pleasure] without regard to its distribution between different persons[66]. Thus it seems to ignore individual rights, whether specific individuals morally deserve particular benefits or burdens, and potentially to endorse great inequalities between persons; e.g. some critics have charged that according to utilitarianism slavery would be morally justified if its benefits to the slave-owners sufficiently outweighed the burdens to the slaves and if it produced more overall utility than alternative practices possible in that society.

[64] Bioethics, as a normative ethical system, is essentially a form of utilitarianism. Princeton Bioethicist, Peter Singer, who advocates infanticide and euthanasia of the elderly and ill on utilitarian principles, is considered the leading bioethics thinker in the world.

[65] John Stuart Mill: British philosopher, political economist and Member of Parliament. An influential liberal thinker of the 19th century. He was an advocate of classical utilitarianism.

[66] Peter singer's argument in favour of infanticide of disabled newborns is based on the utilitarian principle that the child's own suffering and that which he causes others who have to care for him, will increase the amount of unhappiness in the world. Killing such a child before, at or after birth will reduce the amount of suffering and increase the total amount of happiness in the world.

Part II: The Ethics of the Early Life Issues:

3. Misdirections and Evasions: Common Media and Bioethics Euphemisms and Red Herrings

“Ball of cells/ball of stem cells”: The term “embryo” is considered too “political” or controversial in many media outlet style guides and various euphemisms are used to deflect the reality. When the term “ball of stem cells” is used, what is referred to is most frequently an embryo at the stage of development where the trophoblast has formed around an inner cavity containing the pluripotent blastomeres.

“Conception/fertilization/implantation”: The discovery of the details of human reproduction was used by some in the medical community to re-define pregnancy to facilitate social acceptance, first of contraception and then of abortion and later artificial methods of and interventions in procreation. For example, if abortion is defined as the ending of a “pregnancy,” and pregnancy begins only after the implantation of the embryo in the uterine wall, then a chemical that kills the embryo before implantation is not abortion.

In 1875 the German zoologist Oskar Hertwig discovered that fertilization involves the penetration of a spermatozoon into an ovum. Thus, the term "conception" was interchangeable with fertilization.

The later manipulation of terminology by members of the medical community to promote the wide use of contraceptives is well documented. In 1959, Dr. Bent Boving suggested that the word "conception" should be associated not with fertilization but only with the process of implantation. Boving said, "The social advantage of being considered to prevent conception rather than to destroy an established pregnancy could depend on something so simple as a prudent habit of speech." [67]

[67] Boving, B.G., "Implantation Mechanisms", in *Mechanics Concerned With Conception*. Hartman, C.G., ed. (Pergamon Press 1963), page 386.

The fertilization/implantation controversy has helped researchers and their lobbyists to obtain legislation allowing their work to continue on the grounds that if an embryo is not implanted, it is not a human being, or even that it does not exist (see note on “pre-embryo” below).

“Embryo Donor”: The concept that someone could be a “donor” of an embryo starts with the assumption that an embryo has no rights. The Oxford Dictionary of Current English gives as the definition of “donor,” “one who gives or donates some*thing*” (emphasis added). There are only two orders of creation in the universe: persons and things. By using the term “donor” to mean one who gives or donates an embryo, is *de facto* defining an embryo as a thing that may be donated. If the embryo can be donated, it is a thing, not a person. A thing may be bought, sold, donated, dissected, experimented upon and destroyed at will. A person may not. If the embryo is a person, none of those things may be done to it.

This is the essential conflict of the debate: is the human embryo a person? The suggestion of most pieces of legislation is to attempt to propose an in-between state of existence, where the embryo is not exactly a person but yet has the potential to become one and thus is not quite considered a thing either.

This conundrum represents a meeting place of two philosophies where they clash and create an insoluble conflict. There can be no third category, no “non-person-non-thing”; either the embryo is one or the other. Most legislation attempts to find a “balance” where only a decision between two opposing ideas is possible.

Even the Canadian government seemed during the debates in the House of Commons to be deeply conflicted over the moral status of embryos in the Canadian bill. Health Minister Anne McLellan, in an assessment of motions to amend the bill, stated that one of the motions would “…prevent the transfer of ownership rights on donated gametes or *in vitro* embryos. *It is not considered appropriate to treat in vitro embryos as property that are subject to ownership*.” (emphasis added) This statement is inexplicable since, if

the embryo were not to be subject to ownership, it would fall into that category of creation which is not a thing, i.e. it would be a person. If this were so, the embryo would also not be subject to donation, freezing, destructive medical experiments, implantation, genetic "selection," recombinant gene transfer, or any other procedure or activity, sanctioned under the bill. Such procedures are a violation of a person's rights. If the embryo is not subject to ownership, he or she is a person and must be protected from gross violations of human rights under internationally accepted agreements, including the Nuremberg Code.

The "donors" of the gametes used to create an embryo are parents. Legal confusion regarding the status of "donors" of gametes in IVF is entering the courts of every country that allows IVF. The parents of a child cannot "donate" that child to medical research while the child lives. It is, therefore, a moral contradiction to say that the parents of a living embryo can donate that embryonic child for medical research while he or she lives.

"Fertilized egg": In mammalian reproduction there is no such thing as a "fertilized egg". Most mammals do not have eggs[68], which are cases formed to protect a developing embryo. An ovum is not an "egg" but a sex cell that when it is ready to be combined with a sperm fuses its 23 chromosomes with those of the sperm to provide half of the DNA of the new embryo.

The term "fertilized egg" is common in the media, and is an error. It betrays either ignorance of mammalian embryology or a bias in favour of downplaying the existence of an embryo from the moment of conception.

"Genetically Identical Copies": The media frequently uses the term "genetically identical" to describe clones but this is inaccurate. A cloned organism is not altogether genetically identical to the "original," the donor of the genetic material. In the case of

[68] The single exception is the single taxonomic order, Monotremata. Monotremes are mammals that lay eggs instead of giving birth to live young. All indigenous to Australia and New Guinea, there are only five species of monotremes in existence.

SCNT, mitochondrial DNA from the ennucleated oocyte is still present in the cloned organism.

Identical twins, despite being natural human clones do not have entirely identical DNA. It is clear that they are separate people, with separate experiences and not merely “copies” of each other.

In 2001 scientists, funded by a private company that hoped to clone deceased pets, created Cc, the cloned cat. Cc raised questions about the relationship of genes to various physical and behavioural traits since it was clear at first glance that the clone and its donor original were quite different. The donor, Rainbow the cat, was a calico with brown, tan and gold on white markings. Cc, her clone, had a striped grey coat over white. Rainbow’s personality was reserved; Cc was curious and playful. Rainbow had a larger body type than Cc.

“Human Being/ Human Person”: The opening section of this book, Part I, Section 1. “When does a human being begin?” asks an essentially scientific question the answer to which the science of human embryology has known definitively for over 150 years. The question that is most often discussed in pro-life circles, "When does a human person begin?" is of a different order. It is a philosophical and legal, not a scientific question.

In the traditional Natural Law philosophies, creation is divided into two orders, persons and things. A person is that in the order of creation that is protected under the law for his or her own sake, and has rights that are inherent, and not derived or contingent upon any other factor. There are no third, or in-between categories, such as a “potential person”, that should be afforded some, but not all the rights of personhood and can, in some ways be treated as a chattel possession.

A person is a created being that has inherent rights as part of his or her ontological nature; a thing has no inherent rights and is not protected under the law except for the benefit of someone or something else.

The new philosophies, however, admit of no necessary connection between a human person and a human being and do not recognise these two essential divisions in the order of creation. Personhood is a malleable and contingent accidental[69] attribute, not an immutable category, that a human being may or may not possess to varying degrees, according to a constantly shifting and debated set of criteria.

Regarding cloning and embryonic research, personhood is normally withheld entirely as long as the intended use of the embryo is to be for research. The "personhood" of the embryo, either cloned or sexually derived is a matter of deep confusion to modern thinkers and legislators who do not base their ideas on the Natural Law. During the debates over the Canadian stem cell legislation, the government issued a set of responses to proposed amendments in which it said that at the same time that the embryo was deserving of "respect", it could be created in a lab, shipped, frozen, discarded, donated or killed and cannibalised for its parts.

Most utilitarian bioethicists give varying arbitrary points of development as the beginning of personhood. Peter Singer, the Ira W. DeCamp Professor of Bioethics at Princeton University, and perhaps the most notorious of the bioethics thinkers, proposes a sliding scale of personhood that would allow parents to decide, up to 30 days after birth, whether a child is a person depending upon how much they want it. Personhood is also regarded as a secondary characteristic related to cognitive function that can be diminished or lost entirely, in old age or after brain injury or an illness like Alzheimer's disease.

[69] "Accident" is here used in its formal philosophical sense, meaning a quality, property or characteristic that is not essential to the nature of a thing. Hair colour or being a lawyer are "accidental" qualities that do not affect the essential nature of a human being.

Bioethicists have offered several answers to the question of human personhood, all building on subjective philosophical norms and imprecise science. These answers have all served to expand the acceptable time-frame for interventions, experimentation using embryos. It is now widely accepted in legislation around the world, that an embryo acquires more "personhood" after 14 days when it is claimed that "twinning" is no longer possible[70].

Dianne Irving writes [71],

> *"All these consider a person only in terms of exercising 'functions', rather than in terms of his/her nature. The rationalist says a person does not begin until he/she can exercise "rational attributes" (self-consciousness, choosing, willing, relating to surroundings, etc.). Empiricists say a person does not begin until he/she can exercise 'sentience' (feel pain or pleasure). Virtually none of these bioethics positions match the scientific facts, and verge on the ridiculous. There is no scientific correlation between any physical development of the brain in the womb or later, and the psychological states claimed to relate to that development. In fact, science indicates that neither "rational attributes" nor 'sentience' can be fully exercised until early adulthood, when the brain is fully developed!"*

"Pre-Embryo": a scientific myth created by bioethicists seeking to downplay the abortifacient nature of chemical contraceptives. Coined by theologian Richard McCormick, S.J., and Clifford Grobstein, a frog embryologist, it was claimed that a pre-embryo was the biological entity that was created at the moment of the fusion of oocyte and sperm up to implantation. This would mean that an embryo proper only came into

[70] This point is arbitrary and is based on the estimation of the development of certain physical structures. It was decided by bioethicists, not embryologists. Twinning can still occur naturally after the formation of the "primitive streak" that is the beginning of the spinal cord. Most legislation has used this criterion and requires that an embryo created for research must be killed before the 14-day cut-off.

[71] "Cloning: When word games kill" Dianne N. Irving, M.A., Ph.D. http://www.all.org/abac/dni001.htm

existence at the time of implantation in the lining of the uterus. This meant that an embryo that was unable, due to changes in the endometrium caused by contraceptive pills, to implant in the uterine wall, was not an embryo and therefore not really a human being.

The term became useful later to scientists and by abortion proponents in the medical community promoting the use for research of living embryos left in storage after being created for IVF, or created by cloning or IVF for the purpose.

The term reflects no scientific reality whatever. It was entirely demolished as "inaccurate and unscientific", by Ronan O'Rahilly, one of the international "deans of human embryology. O'Rahilly developed the "Carnegie" stages of human embryology, considered the standard of embryological development. He sits on the international board (Nomina Embryologica) which determines the terminology to be used in this field.

The internationally recognised nomenclature of embryology identifies the zygote, the single-cell product of the fusion of sperm and oocyte, as an embryo.

“Therapeutic/reproductive” cloning: The distinction between two putative “types” of cloning is false but has been widely promulgated in the media. There are several different methods of producing a cloned embryo, but the desired result is always same: a living, developing human being at the embryonic stage. The therapeutic/reproductive distinction refers only to the intended use of the cloned embryo. If the embryo is to be disaggregated and its stem cells harvested, or if it is to be used for some other type of research, it is called “therapeutic cloning.” If the intended use of the embryo is implantation with the hope of bringing the child to term, the process is said to be “reproductive.” All human cloning is “reproductive” since the intention is to create a human being.

Part II: The Ethics of the Early Life Issues

4. The Case for a Pro-Life View of Embryo Research

"Our conviction about what is natural or right should not inhibit the role of science in discovering the truth," Prime Minister Tony Blair responding to critics of Britain's plan to clone human embryos for research.

The quote above encapsulates the problem of the vast gulf between the moral assumptions of the great majority of people and those of the ruling elites. To most adults, trained from their earliest childhood in traditional moral concepts, if a thing is unnatural or wrong, it cannot be done.

But the idea that a "conviction about what is natural or right" is irrelevant and should be set aside like old cultural baggage in the name of progress is one that is held by the great majority of the classes that operate government, academia and the media. This notion is the single most obvious result of the vast philosophical shift in our culture away from traditional, objective and rational philosophies.

Prime Minister Blair was Britain's head of government for the ten years during which Britain led the world in abandoning traditional moral foundations in medical and research ethics through the decisions of the Human Fertilisation and Embryology Authority. His statement, which to those habituated to traditional moral concepts is an absurdity, is typical of the opinions voiced in the British House of Commons, in the Canadian Parliament and legislatures around the world, and in the meetings of international associations of bioethicists and researchers.

American pro-life apologist and lecturer Scott Klusendorf, using classical principles of logic, concluded that if Blair's statement were to be taken to its logical conclusion, then "scientific progress trumps morality, [and] one can hardly condemn Hitler for grisly medical experiments on Jews"[72].

[72] http://prolifetraining.com/Articles/stem-cell-ethics.htm

It is possible to cut through the Gordian Knot of modern philosophical assumptions with some straightforward principles. These have been laid out by Klusendorf who has made a life work of training people in a method of argument based on classical philosophy and rhetorical principles. Klusendorf's methods were developed when answering the pro-abortion claims, but are equally applicable to the issue of embryo research and cloning.

The entire pro-life argument can be made simply with the following syllogism:[73] "It is wrong to kill an innocent human being; the unborn are innocent human beings; therefore abortion, which kills the unborn, is wrong."

If the first two premises are granted or proved, the conclusion logically follows. Precisely the same syllogism and argument can be made against any form of embryonic experimentation, which has caused the deaths of uncountable millions of embryonic human beings.

"You can't kill people to solve your problems" – Clarifying the issue and making the rational argument [74]

"It is wrong to buy, sell, donate, kill, experiment upon or otherwise treat human beings as chattel; human embryos are human beings; therefore embryo research is wrong."

1) The first premise of the syllogism above, "It is wrong to kill an innocent human being," is the foundation of the argument. Once the first premise is agreed, the second must be demonstrated. In the first section of this document, the case is made clearly for the complete humanity of the human embryo. If it is accepted, according to Natural Law

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[73] Syllogism: An argument consisting of three categorical propositions, two serving as premises and one serving as a conclusion. "All cats are mammals; my pet is a cat; therefore, my pet is a mammal," is an example of a valid syllogism.

[74] This section is adapted from a pair of articles by Scott Klusendorf. "How to Defend Your Pro-Life Views in 5 Minutes or Less" and "Is Embryonic Stem Cell Research Morally Complex?" http://prolifetraining.com/Pro-Life_Articles.htm

principles, that a human being and a human person are indistinguishable, the conclusion must follow.

If a human embryo is a human being, killing him or her to benefit others is a serious moral wrong. No appeal is possible to the potential therapeutic benefits of treating him as chattel and using him in medical experiments. A human being cannot be used as an instrument.

S.L.E.D.

"There is no morally significant difference between the embryo you once were and the adult you are today.[75]" Scott Klusendorf.

The differences between a person in the embryonic stage and an adult are what are referred to in philosophy as "accidental". They are differences of size, level of development, environment, and degree of dependency. These can easily be recalled by memorizing the mnemonic acronym "SLED".

Size: Embryos are smaller than newborns and adults, but this does not affect their nature as human. Only a fundamental, "ontological" difference is relevant to the question. If the embryo is a human being, we cannot kill it or treat it as an instrument, even at the first, single-cell stage.

Level of development: Every human being at a different levels of development, physical, social, emotional or economic is still a human being. Older children do not have more rights than their younger siblings. The rights of a human being to protection under the law cannot be dependent upon cognitive function, age, or any ability. If rights are to have meaning, they must be immune from arbitrarily assigned criteria.

Environment: The embryo's location, either in a lab or in a uterus, does not affect its human nature. Human nature is not changed by any external situation.

[75] Scott Klusendorf "Is Embryonic Stem Cell Research Morally Complex?"

Degree of Dependency: It is often argued that human beings must be fully independent in order to qualify as persons. But all human beings are dependent to greater or lesser degrees on their environment. We need air, food, shelter, clothing, the protection of a family and community and the law. The degree to which we are independent as adults can change in a moment. It is not logical, therefore, to say that a sudden change to a greater or lesser degree of dependency makes any change in the inherent nature of the person.

The Rustling Bush

A common method of teaching ethics is to examine hypothetical situations and allow students to discuss them. One of these is called “The Rustling Bush.”

Two hunters are out in the woods and move a short distance from each other, out of sight. One of the hunters sees a bush rustling. He wonders if he should shoot. The rustling may be caused by a deer or by his friend.

According to many abortion advocates and their imitators proposing to create and use human embryos for research, he should shoot on the grounds that he cannot be certain, it is not known, if the bush-rustler is a deer or his friend, a human being.

The argument is frequently made that it is unknown at what point a human person or a human being begins, or at what point “human life” begins. The question, however, is irrelevant when the intended act is one that might harm the entity or cause its death.

Classical Natural Law ethics always chooses in favour of even the slightest possibility of human life and forbids the hunter to shoot, and equally, forbids an abortionist from aborting and genetic researchers from continuing their experiments with embryos. If there is the slightest possibility that a human being may be present, the dangerous or destructive act cannot be done.

The Nuremberg Code – Consent and medical benefits

Traditional ethics also requires that if experimentation is done on a human being, no matter what stage of development, there must be some benefit to the subject and the subject must consent.

The Nuremberg Code was accepted by the scientific world after the revelations of Nazi atrocities using interned prisoners for medical experiments. It laid down the requirements for using human subjects in medical research that have been accepted around the world.

The articles of the Nuremberg Code include:

"Voluntary consent of the human subject is absolutely essential."

and

"No experiment should be conducted where there is an a priori reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects."

and

"During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible."

The embryonic human being cannot give consent and cannot end the experiment. It is usually argued that embryonic research is ethical because the "donors" or parents of the embryo give consent. But no parent can give legal consent to have a child used in medical experiments if the unavoidable result will be the death of the child.

Part II: The Ethics of the Early Life Issues

5. The Case for a Pro-Life View of New Reproductive Technologies[76]

A basic anthropological divergence

The philosophical essence of the traditional[77] view on new reproductive technologies is that the human body and the human person are not separate. That the body is not merely a "suitcase" for a soul or a mind or "personhood". To the contrary, the body and the mind and the soul constitute a totality, an absolutely unique and sovereign singularity – a person. "*Corpore et anima unus*[78]". An intervention on the human body, therefore, affects not only the tissues, the organs and their functions but also involves the person himself.

In the new philosophical view that supports both abortion and the new reproductive technologies, the body and the mind or soul are essentially separate[79], the body, the physical realities, are disparaged as being of secondary importance and the existence of a set and universal human nature denied. Man has no destiny other than what he creates for himself, and his nature is malleable according to private preference. Marriage, therefore, also has no transcendental nature but exists for whatever purpose decided upon by the individuals involved.

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[76] The information in this section has been adapted from the Vatican document "Donum Vitae". See Part V: Resources 1. Source documents

[77] What is now regarded as the "pro-life" view, was, until the 1950's, held almost universally by all but a few people. The massive societal shift in philosophical perspective discussed in the previous sections has reduced the traditional Judeo-Christian or Western view of human nature to being the peculiar minority opinion of a few pro-life persons and a small minority of Catholics (including the Church's magisterial authority). In this document, the terms "pro-life view" and "traditional view" are more or less interchangeable.

[78] "The body and the spirit are one" Gaudium et Spes, 14, par.1

[79] Mind/body problem: cf; "Cartesian dualism" in the Glossary of Philosophical Terms in Appendix 1. It holds that the mind is a nonphysical substance. Descartes was the first to formulate the mind-body problem in the form in which it exists today. The mind/body problem, or "dichotomy", is the view that "mental" phenomena are, "non-physical" (distinct from the body). This view of reality leads to consider the corporeal as little valued and trivial.

The difference between the pro-life perspective and the prevailing view of the world of medicine and law on new reproductive technologies is not only dependent upon the problem that artificial interventions in procreation invariably result in the death of persons at the embryonic, and therefore most vulnerable, stage. It is in fact a fundamental difference in anthropology, in understanding of the nature of man.

The chasm that exists between the pro-life and the prevailing philosophies regarding assisted reproduction, is created by the loss of the meaning of marriage and its relationship with the totality of the human person. In the new philosophies, marriage is merely a social contract created by the barest physiological and economic necessities and the held-over customs of past human societies. In this view, one held by almost the entirety of the contemporary medical, legal and scientific community, marriage has no transcendental[80] reality whatever and no intrinsic connection to the nature of persons. It can be entered into and left in the same way as a business contract. As we have seen with the advent of so-called “homosexual marriage” it has no bearing on the physical realities of human biology or procreation, which are considered to be “merely” physical functions distinct from the marriage “contract.”

The pro-life view is that marriage and procreation are inextricably linked and intrinsically connected to the physical and spiritual totality of the person. It holds that only in the context of this complete and transcendent union can a child have the opportunity for its fullest physical, social, psychological and spiritual development.

Why a Catholic document?

This traditional or pro-life view has been fully developed in the work of the Catholic Church’s teaching authority in the years since the advent of new reproductive technologies and has perhaps its most comprehensive expression in the document from the Vatican’s Congregation for the Doctrine of the Faith, “Donum Vitae” (1987), from which this section has been developed.

[80] Transcendent: beyond, or distinct from, the time/space world.

The guiding principle, the axiom, that sums up the pro-life position is expressed in this document:

> *"The child has the right to be conceived, carried in the womb, brought into the world and brought up within marriage: it is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development."*

Flowing from this axiom, together with the basic pro-life principle of the right of every human being to life from the first moment of conception, is the entirety of the pro-life response to the various techniques and methods employed by the fertility industry.

A person making the case for a pro-life argument or perspective on the new reproductive technologies does not have to be Catholic to find in Donum Vitae an invaluable source of guidance. Any moral person, even an atheist, who holds the traditional Natural Law-based philosophical assumptions can find in this document a comprehensive examination of and answer to the ethical problems of new reproductive technologies, from their roots in philosophy, to their extension in the ethics of given clinical practices.

Basic criteria of ethical judgement

The pro-life position on the new reproductive technologies, particularly those which are not strictly therapeutic, is based on particular moral and ethical principles, which are themselves based on the transcendent and unitary anthropology described above. New reproductive technologies cannot be outright rejected on the grounds that they are artificial, but they must be given a moral evaluation in reference to the dignity of the human person,

Criteria for ethical judgement on particular applications of scientific research and technology must first include:

- primary and fundamental right to life
- the dignity of the person who is endowed with a spiritual soul and with moral responsibility
- an unconditional respect for the fundamental criteria of the moral law.

The first criterion must be that the physical life of the person, the embryo, is preserved. Any intervention that ends the life of an innocent human being is contrary to the natural moral law. It is only in the context of physical life that all the other values of the person can be fulfilled and developed. From the moment of conception, the life of every human being is to be respected in an absolute way.

Given the transcendent nature of the person, and marriage, that naturally pertains to it, the transmission of human life has a special character of its own and is a fundamental part of man's natural dignity. If marriage is merely a contractual agreement between distinct individuals, a business arrangement, then it stands to reason that there is no special relation between it and natural procreation. But the pro-life position derives from the understanding that man is more than his body and that marriage is more than a mutually agreed-upon legal contract. It is only in keeping with his true nature that the human person can achieve self-realization as a "unified totality."

Can one speak of a right to direct experimentation upon human embryos for the purpose of scientific research?

The fact that national legislatures have gone forward with legalising such experimentation indicates that they have come to a definite conclusion regarding their status, despite the usual protestations of "respect" and "balance" in the treatment of embryos. The conviction that the embryo is a thing, not a person, and therefore has no inherent rights of its own, grants that there is a right to experiment on them, as with any other chattel possession. But in ethics, it is incumbent upon the person proposing to act to demonstrate that his proposed act is morally licit. The mere presumption that an embryo is not a person is not proof and if it cannot be proved that an embryo is not a person, if there is, in other words, the slightest chance that a human person is present, any act that may harm that person must be avoided.

Under the above criteria, can other forms of experimentation, including cloning, be morally licit?

In vitro fertilisation has led the way to other forms of biological and genetic manipulation of human embryos, such as attempts to create human/animal hybrids or the gestation of human embryos in the uterus of animals, or the attempt to create artificial wombs for the human embryo. These procedures are contrary to the human dignity proper to the embryo, and at the same time they are contrary to the right of every person to be conceived and to be born within marriage and from marriage.

Also, attempts to create a human being asexually through "twinning", SCNT or any other cloning method, are to be considered contrary to the moral law, since they are in opposition to the dignity both of human procreation and of the right of a child to be naturally conceived within marriage.

The same principle applies to the freezing of embryos. Cryopreservation constitutes an offence against the respect due to human beings by exposing them to grave risks of death or harm to their physical integrity and depriving them, at least temporarily, of maternal shelter and gestation, thus placing them in a situation in which further offences and manipulation are possible.

The “right to a child”/ “right to parenthood” vs. life as a gift

The concept that there is such as a thing as a “right” to parenthood makes the assumption that the child is a chattel possession since to be a parent it is necessary to have a child. If there is a right to parenthood, there is a right to “own” or obtain a child. This assumption ignores the nature of the child as a sovereign person. There may be a legitimate desire to be a parent but no matter how strong and how natural, that desire does not constitute a right. Under the traditional view, a child is considered a gift from God and understood as such to be a created being, a person, with all the rights of personhood. Infertility, under this understanding, may be a serious misfortune, but it is not a violation of any “right” to which sufferers may have right of recourse.

Can the manipulation of the genetic inheritance be morally licit?

Certain attempts to influence chromosomic or genetic inheritance are not therapeutic but are aimed at producing human beings according to certain desired traits. These manipulations start by presuming that those doing the experiments know what traits would “improve” the race. But they are contrary to the personal dignity of the embryonic person, to his integrity and identity. Therefore in no way can they be justified on the grounds of possible beneficial consequences for future humanity, an outcome that is only presumed, and not based on any evidence. Every person must be respected for himself: in this consists the dignity and right of every human being from his or her beginning.

Are IVF or other interventions in human procreation morally licit?

The development of the practice of in vitro fertilization has required innumerable fertilizations and destructions of human embryos. The usual practice presupposes a hyperovulation on the part of the woman[81]: a number of ova are withdrawn, fertilized and then cultivated in vitro for some days. Usually not all are transferred into the genital tracts of the woman; some embryos, generally called "spare ", are destroyed or frozen. On occasion, some of the implanted embryos are sacrificed for various eugenic, economic or psychological reasons. Such deliberate destruction of human beings or their utilization for different purposes to the detriment of their integrity and life is contrary to human person’s right to life.

Through these procedures, with apparently contrary purposes, life and death are subjected to the decision of man, who thus sets himself up as the giver of life and death by decree. This dynamic of violence and domination may remain unnoticed by those very individuals who, in wishing to utilize this procedure, become subject to it themselves.

[81] Hyperovulation is achieved by the use of drugs that have been shown to be dangerous to the woman’s health.

Why must human procreation take place in marriage?

Given that a child is a free and sovereign person and must always be seen as a gift and not a possession, a truly responsible procreation must be the fruit of marriage. Human procreation has specific characteristics by virtue of the personal dignity of the parents and of the children. It must be the fruit and the sign of the mutual self-giving of the spouses, of their love and of their fidelity.

The fidelity of the spouses in the unity of marriage involves reciprocal respect of their right to become a father and a mother only through each other. The child has the right to be conceived, carried in the womb, brought into the world and brought up within marriage: it is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development.

This security of the child within a faithful marriage contributes to the good of civil society; the vitality and stability of society require that children come into the world within a family and that the family be firmly based on marriage.

Heterologous artificial fertilization[82] and "surrogate" motherhood

Heterologous artificial fertilization is contrary to the unity of marriage, to the dignity of the spouses, to the vocation proper to parents, and to the child's right to be conceived and brought into the world in marriage and from marriage. Respect for the unity of marriage and for conjugal fidelity demands that the child be conceived in marriage; the bond existing between husband and wife accords the spouses, in an objective and inalienable manner, the exclusive right to become father and mother solely through each other. Heterologous artificial fertilization violates the rights of the child; it deprives him of his filial relationship with his parental origins and can hinder the maturing of his personal identity.

[82] Heterologous IVF: the technique used to obtain a human conception through the meeting in vitro of gametes taken from at least one donor other than the two spouses.

A child so conceived would have, potentially, as many as four “parents” only two of whom would be biological. With the addition of “surrogacy” another “mother” is added.

For the same reasons which lead to the rejection of heterologous artificial fertilization, surrogacy also cannot be licit. It is contrary to the unity of marriage and to the dignity of the procreation of the human person. Surrogate motherhood represents an objective failure to meet the obligations of maternal love, of conjugal fidelity and of responsible motherhood; it offends the dignity and the right of the child to be conceived, carried in the womb, brought into the world and brought up by his own parents.

Why is homologous IVF[83] not licit?

There is a natural, inseparable connection between the unitive meaning and the procreative meaning of the conjugal act. By its intimate structure, the conjugal act, while most closely uniting husband and wife, capacitates them for the generation of new lives, according to laws inscribed in the very nature of man and of woman.

It is never licit to separate the two aspects to exclude either the procreative intention or the conjugal relation. The same principle prohibits the use of artificial contraception in marriage. Just as contraception deliberately deprives the conjugal act of its openness to procreation so does homologous artificial fertilization, in seeking a procreation which is not the fruit of a specific act of conjugal union objectively effects an analogous separation between the goods and the meanings of marriage.

In the former case, contraception attempts union while deliberately excluding its natural end of fruitfulness; in the latter, artificial procreation attempts to bring a child into being by commanding the natural process and excluding the unitive aspect of sex.

The moral value of the intimate link between the goods of marriage and between the meanings of the conjugal act is based upon the unity of the human being, a unity

[83] Homologous IVF: the technique used to obtain a human conception through the meeting of gametes of both the spouses.

involving body and spiritual soul. The conjugal act, as is the person, is inseparably both corporal and spiritual.

Fertilization achieved outside the bodies of the couple remains by this very fact deprived of the meanings and the values which are expressed in the language of the body and in the union of human persons.

The origin of a human person is the result of an act of giving. The one conceived must be the fruit of his parents' love. He cannot be desired or conceived as the product of an intervention of medical or biological techniques; that would be equivalent to reducing him to an object of scientific technology. No one may subject the coming of a child into the world to conditions of technical efficiency which are to be evaluated according to standards of control and dominion.

Part II: The Ethics of the Early Life Issues

6. Other Ethical Problems with New Reproductive Technologies

Groups, such as feminists, other than those who hold strictly pro-life or "traditional" ethical positions are examining the NRT and bringing other ethical issues forward as reservations.

This section gives a brief list of other ethical problems that do not necessarily directly pertain to the previously raised and strictly "life-related" issues.

[84]New reproductive technologies (including cloning)

- can result in genealogical confusion and the risk of unwitting marriages between close relatives.
- can lead to deception in the family as the price to pay to preserve the anonymity of gamete donors or "surrogate mothers".
- will require the obtaining of enormous numbers of human ova, particularly for cloning experiments. Further fears are raised that this demand will lead to the exploitation of poor women, especially those in the developing world vulnerable to financial exploitation or government intimidation.
- involves the commodification, commercialization and exploitation of persons and processes.
- involves women and donors in serious physical and/or psychological risks.
- have a very low success rate and carry enormous financial costs. These make the cost incommensurate with the risks and problems.
- has already resulted in cases of "missing" embryos, or the wrong embryos being implanted accidentally.
- Involve the use of potentially dangerous fertility and hyperovulation drugs and surgical interventions.
- are increasingly resulting in long contentious disputes over custody in courts, leading to public distress and social confusion over the meaning of parenthood and the family.
- often results in serious medical consequences for the child conceived.

[84] Adapted from "The Ethics of IVF" by Anthony Dyson. Mowbray, 1995.

- opens the way for eugenic practices such as pre-implantation genetic diagnosis, and brings into being the concept of a "designer" or perfect child created according to specifications.

- increased rates of abortion when a child does not "work out".

Feminist Critique
Feminist thinkers are increasingly objecting to IVF and related procedures saying they are exploitative and unfairly biased in favour of wealthy clients as well as laying almost all the physical and mental risks on the woman.

Failure Rates
The UK's Human Fertilization and Embryology Authority reported in 1992 that between 1985 and 1990, the rate of live births as a result of IVF was between 8.6% and 12.5%.

Genetic Abnormalities Associated with NRT
Many studies have shown increased rates of birth defects, illnesses, and genetic abnormalities in children conceived through the various processes of artificial procreation[85].

[85] In the interests of brevity, specific references are not included here, but they can easily be found online at www.lifesite.net Enter the keywords, "IVF dangers" into the search engine.

Part III: The Canadian Situation

1. Time Line on Canadian Stem Cell Research and Cloning

October 1989: An order-in-council establishes the Royal Commission on Reproductive Technologies.

Its mandate is to "inquire into and report upon current and potential medical and scientific developments related to new reproductive technologies, considering in particular their social, ethical, health, research, legal and economic implications and the public interest, and recommend what policies and safeguards should be applied."

November 1993: The Royal Commission issues its report consisting of two volumes, titled, "Proceed with Care," It made 293 recommendations. Fifteen volumes of research are also published.

The recommendations include the establishment of a National Reproductive Technologies Commission, restricting access to in vitro fertilization, allowing embryos to be experimented upon for up to 14 days post-fertilisation, regulating donor insemination and oocyte donations, requiring licensing for assisted conception services, and generally permitting only non-commercial services.

The report also recommends that research on ectogenesis[86] , cloning, animal/human hybrids, collection and maturation of oocytes from aborted human foetuses and some other practices be prohibited under the Criminal Code.

After the Commission's report is issued, the federal government calls for a voluntary moratorium on the part of researchers on some of the practices, which is generally ignored. The government then brings forward a bill regulating some of the aspects of the fertility industry, which died when Parliament was dissolved in 1995.

[86] Ectogenesis: the creation of mammalian life outside the womb.

May 2001: Federal (Liberal) government tables new legislation, C-56, that it claims will ban human cloning. Health Minister Allan Rock (a Catholic) tells the Parliamentary Health Committee that research using what he calls “human reproductive materials” has the potential to bring “significant benefits to Canadians and, therefore, this research should be encouraged."

The bill allows:

- research on the extra embryos created for in-vitro fertilization with the donors' consent at any time during the first 14 days of development;
- the use in experimentation of stem cells derived from existing embryos;
- surrogate motherhood or so-called rent-a-wombs (although not for profit);
- the creation of chimeras-"a human embryo into which a cell of a non-human life form has been introduced";
- research involving specified combinations of human and animal DNA.

December 2001: The House of Commons Health Committee, in its recommendations on reproductive and experimental technologies, supports the destruction of human embryos for research purposes. The committee, while opposed to the creation of embryos for the purpose of research, would permit licensed researchers to use so-called surplus embryos from fertility treatment (in vitro fertilization) "subject to the consent of the donors."

February 2002: Quebec Minister of State for Science and Technology David Cliche announces a provincial ban on all destructive research involving human embryos. Under new guidelines on ethical research announced on January 10, the creation and use of stem cells extracted from human embryos is forbidden. So are all forms of human cloning and the creation of animal-human hybrids. Unlike many bans in other countries, the Quebec prohibitions also apply to privately funded research.

March 5, 2002, Canadian Institutes of Health Research issues guidelines allowing human embryos that had been left over and were donated by parents, may be used for

medical research before the age of 14 days. The consent of the parents or "donors" is the key element in judging the ethics. The guidelines allow The CIHR proposed to establish a Stem Cell Oversight Committee to review funding decisions. The guidelines prohibit the funding of human cloning, including cloning for research or so-called therapeutic cloning. With the government's legislation in Committee, pro-life advocates accuse the CIHR of pre-empting Parliament by issuing funding guidelines before there is a law regulating or prohibiting the practices in question.

May 2002[87]**:** Noted U.S. expert Dianne Irving issues a detailed technical analysis of bill C-56. Dr. Irving points to numerous problems with the bill: it makes no differentiation between sexual (in vivo and in vitro) and a-sexual (cloning) reproduction; many reproductive terms are not mentioned in the legislation and thus fall outside its jurisdiction; it does not define or insufficiently defines numerous vital terms such as embryo, clone, gene, genetic, human being, person, free and informed consent, cloning, thus making it practically impossible to enforce the prohibitions and regulations. Furthermore, its definition of cloning applies to only one technique, thus leaving the door open to other forms of cloning.

Irving, who had examined dozens of such pieces of legislation from around the world, calls the Canadian bill the "most deceptive" bill she has yet encountered. Irving's warning marks the beginning of concerted pro-life opposition to the bill and the effort to defeat it outright.

Campaign Life Coalition, Canada's main pro-life lobbying group receives much criticism from within the pro-life community, including pro-life MP's for its "all or nothing" approach and is accused of being opposed to the "incremental approach". Ultimately, these criticisms leave the group virtually alone in opposing the bill. In the end, even the representative of the Canadian Conference of Catholic bishops in his presentation to the Senate at the 11th hour, supports the idea that a Catholic could vote for the

[87] Irving's analysis can be read at
http://www.lifesite.net/features/stemcellembryo/IRVINGBILLc56analysis.html

unamended bill in good conscience and that perhaps any bill, no matter how flawed is better than none.

December 2002: Dr. Irving presents her conclusions to the House Committee examining the legislation, (that has been renamed C-13). In her written testimony to the committee, Dr. Irving points out that the legislation is all but completely useless failing to prohibit the procedures it claims to prohibit. According to Dr. Irving, by the use of false definitions, Bill C-13 would even allow for human reproductive cloning. She warns that under the legislation legally valid informed consent will not be possible and she presents compelling reasons why “no bill is better than a flawed bill” such as bill C-13.

January 2003: Campaign Life Coalition issues a warning and an appeal to pro-life supporters that the C-13 is the “most dangerous piece of legislation since 1969”. Comparing C-13 with Pierre Trudeau’s notorious Omnibus Bill of 1969, which legalized abortion on demand. CLC writes in a newsletter, “If stem cell research is allowed, a Pandora’s box of ethical horrors will be opened as scientists will demand a never-ending source of stem cells; they will demand that any limits on the research be lifted and that any source be mined for their stem cells: so-called leftover embryos from IVF treatments, the remains from abortions, the creation of clones.”

Throughout the history of the legislation, the media unanimously echoes the government's claim that the bill bans human cloning and regulates the use of embryonic stem cells.

December 2002: The Health Committee amends the bill to read, “Persons who seek to undergo assisted reproduction procedures must not be discriminated against, including on the basis of their sexual orientation or marital status.”

February 2002: John Bryden (L, Wentworth-Burlington), a pro-abortion MP, who supports embryonic stem cell research, points out an inconsistency in the bill regarding its supposed prohibition of the creation of human embryos for research. Bryden notes

how one clause in the bill specifically permits the creation of human embryos for the purpose of instruction and better working of in vitro fertilization. Under the prohibited activities section 5 (1) b the bill reads "No person shall knowingly create an in vitro embryo for any purpose other than creating a human being or improving or providing instruction in assisted reproduction procedures."

June 2002: the government recesses for the summer on June 19 without voting on C-13, giving pro-life lobbyists and supporters the opportunity to approach MP's in their constituencies over the summer.

June 2002: The federal funding agency, the Canadian Institutes of Health Research, is petitioned by the Stem Cell Network (SCN) to fund two projects that will use embryos for research. Dr. Ron Worton, the SCN's scientific director, said that scientists are tired of waiting for government to act and that the "courtesy" of not going ahead with such research will soon end. Worton added "There is nothing that we are doing or contemplating doing that would be outlawed or banned by the legislation as it stands."

September 2003: Campaign Life Coalition issues a CD ROM explaining their criticisms of the legislation and distributed them to MPs. They ask MP's to defeat the legislation saying no amendments could make it supportable. CLC says the bill is more than merely "flawed" but that its premise assumes the non-personhood of the embryo and treats them as mere raw material for experimentation.

September 2003: Despite that the government had, in June, declared that C-13 is a top priority, a vote continues to be delayed as more pro-life MP's in opposition and in the Liberal backbenches continue to oppose it.

September 2003: Liberal MP Paul Szabo (Lib, Mississauga South) brings forward a list of amendments meant to overturn some of the worst provisions of the bill. Szabo is the most prominent of the Liberal opponents of the bill. He would later have to fight his own

caucus and party leader to keep the nomination for his Mississauga South seat at the next election.

October 2003: The Liberal government whip, Don Boudria, "calls the question" and ends debate and any possible amendments to C-13.The government also refuses a request by Paul Szabo to reprint the bill so that it would reflect the already passed amendments and MPs could know what they are voting for.

November 2003: C-13 is passed in the House of Commons with a 149-109 vote but Parliament prorogues before the bill could move on to the Senate. It is renumbered C-6. Campaign Life Coalition contacts in Parliament said the vote came only after a deal was struck with the New Democrat MP's. 40 MPs abstained.

Campaign Life Coalition Director of Research Hilary White wrote in her clause-by-clause critique, "The bill's evasiveness, ambiguity and scientific inaccuracy on the subject of cloning and the creation of embryos exclusively for experimentation, has opened the door to human cloning. What is worse, once the bill is passed the public perception of urgency to prohibit cloning will pass. The procedures used to create clones will quietly go on in research labs protected by the bill's faulty definitions and unhindered by any further calls for prohibition."

November 2003: The Bishops of British Columbia explicitly urge MPs to vote against the legislation. Archbishop Adam Exner of Vancouver, Bishop David Monroe of Kamloops, Bishop Eugene Cooney of Nelson, and Bishop Raymond Roussin of Victoria all signed a letter to Members of Parliament in April, arguing, "When it comes to killing innocent human beings for the sake of medical research, half-way limiting measures, i.e., beginning a regulated practice through this legislation, will not do. If human beings are somebodies, treating them under any circumstances as mere biological material flagrantly contravenes human dignity. We hope you agree… Human embryos are little somebodies, to be sure. But treating every human being as a somebody is also surely a core principle for any public policy worthy of consideration."

December 2003: Campaign Life Coalition distributes its 22-page “A Final Critique of C-13” to Senators. The Critique says the bill’s fundamental problem is its flawed philosophy that assumes a human embryo is not a person. “The bill is founded upon a materialistic philosophy that assumes a human being is no more than a biological machine, a collection of cells and biochemical functions. It presents a utilitarian concept of the value of an individual human being: that value derives from his or her usefulness to another, whether it be for disease therapies or the enjoyment of parenthood.”

December 2003: The Canadian Conference of Catholic Bishops issues a letter to Senators, many of whom are at least nominally Catholic, taking a morally neutral stand on the bill. While it says that the legislation was "deeply flawed” the letter adds that "there is much in the proposals that could be supported." In the end, the letter from CCCB head Bishop Berthelet does not give clear direction to Catholic Senators, other than to leave them to "discern the best way to protect human life and dignity after reflecting on all of the resources available to them."

Campaign Life Coalition responds, “No matter what good there possibly is in Bill C-13, no amount of good can cover the evil that's in there with the sanction of destructive research on human embryos.”

February 2004: The representative of the Canadian Conference of Catholic Bishops (CCCB), Bishop Terrence Prendergast, tells the Senate Committee during final hearings that there is no one moral way to vote on the bill. When asked directly whether the “Church really does not endorse this bill,” Prendergast replies, “The Bishops' Conference has not taken a position on that. It has simply laid out before you the difficult challenge that you have. I think the opportunity for a Catholic legislator is to allow his or her faith and mind and heart to be infused with the tradition and values, but also to see what is possible.

“If a person is informed by faith, informed by reason, and makes the proper decision, I do not think anyone can reproach that person.”

The Senate committee refused to hear presentations from pro-life groups. Both CLC, the political arm of the pro-life movement, and Life Canada, the educational arm, were denied an opportunity to present before the senate committee on the grounds that the pro-life position was already being presented by the Canadian Conference of Catholic Bishops.

March 2004: C-13 is passed by a unanimous vote by the Senate social affairs committee on March 3.

Part III: The Canadian Situation

2. The Assisted Human Reproduction Act

Royal Commission on Reproductive Technologies

Canada began to examine the ethics and legalities of the artificial reproduction industry, already flourishing commercially, in 1989 when the government issued an order-in-council to establish the Royal Commission on Reproductive Technologies.

In 1993, the Commission issued its findings in a report titled, “Proceed with Caution.” The report made 293 recommendations, including the establishment of a National Reproductive Technologies Commission; restricting access to in vitro fertilization; allowing embryos to be experimented upon for up to 14 days post-fertilisation; regulating donor insemination and oocyte donations; requiring licensing for assisted conception services; and permitting only non-commercial services. The report also recommended that research on ectogenesis[88] , cloning, animal/human hybrids, collection and maturation of oocytes from aborted human foetuses and some other practices be prohibited under the Criminal Code.

An Act Respecting Assisted Human Reproduction

After a previous bill on new reproductive technologies died on the order paper in 1997, in May 2001 the federal (Liberal) government tabled new legislation, C-56, that it claimed will ban human cloning. Health Minister Allan Rock (a Catholic) told the Parliamentary Health Committee that research using what he called “human reproductive materials” has the potential to bring “significant benefits to Canadians and, therefore, this research should be encouraged."

From the outset, pro-life advocates were sceptical, knowing the bill allowed:

- research on the extra embryos created for in-vitro fertilization with the donors' consent at any time during the first 14 days of development;
- the use in experimentation of stem cells derived from existing embryos;

[88] Ectogenesis: the creation of mammalian life outside the womb.

- surrogate motherhood or so-called rent-a-wombs;
- the creation of chimeras, "a human embryo into which a cell of a non-human life form has been introduced";
- research involving specified combinations of human and animal DNA.

In May 2002 noted U.S. bioethics expert and scientist, Dr. Dianne Irving PhD, contacted Canadian pro-life lobbyists warning that the bill was full of deceptive language and failed to ban cloning. It was at this point that concerted opposition to C-56, shortly to be renamed C-13, began in the pro-life community.

In Dr. Dianne Irving's submitted testimony[89] to the House Committee, she wrote:

> By default, this bill would allow most unethical research addressed particularly because of the use of contradictory scientific definitions, the use of erroneous scientific definitions (Section 3 of the bill), the absence of necessary and relevant accurate scientific definitions, the application of those erroneous scientific definitions to both "Prohibited" (Section 5 - 9) and "Controlled" activities (Section 10 - 13), and the various linguistic loopholes which advance these problems and inadequacies, this Bill would in fact allow:
>
> 1) In vitro fertilization (IVF)
> 2) Almost all forms of human embryo research, including:
>   a) IVF research
>   b) Human embryonic stem cell research
>   c) Prenatal "selection" (eugenics)
>   d) Both "therapeutic" and "reproductive" cloning of human beings by means of all cloning techniques, including the following cloning techniques:
>   - Somatic cell nuclear transfer (SCNT)
>   - Germ line cell nuclear transfer (GLCNT)

[89] http://www.lifesite.net/ldn/2002/dec/021217a.html

- "Twinning", or "embryo multiplication" (e.g., blastomere separation and blastocyst splitting)
- Mitochondrial transfer
- Pronuclear transfer
- Parthenogenesis
- Formation of chimeras, mosaics, hybrids
- Any "demethylation[90]" research involving the [asexual] production of a human embryo (properly defined)
- "Cloning through the generations", i.e., the use of DNA-recombinant gene transfer with pronuclei, germ line cells, gametes, embryos, etc. (eugenics)

Irving's critique of the bill's terminology includes:

Omitted Definitions:
"Human Being": "Human" must include the human embryo, defined as beginning to exist from the beginning of penetration of the oocyte by the sperm (sexual reproduction) or as the immediate product of a-sexual reproduction. The Canadian Criminal Code states that a human being does not come into existence until it has completely left the mother's body. The term human being is used throughout the Bill but nowhere is it defined.

"Person"/ "Human person": Some bioethicists feel that great apes and higher animals are "persons".

"Ethics": There are many different forms of ethics. To which one does the Bill adhere?

[90] The genetic "reprogramming" of a cell to render it totipotent. In other words, the creation of an embryo from a somatic cell.

“Ethically Acceptable/Unacceptable”: What is acceptable varies depending on the definition of “ethics.”

“Human Mosaic”: The bill does not include a definition of “mosaic.” Thus mosaic research would not be covered by this Bill. Again, if the entity is not specified in the Bill there is no reason to think it will be prohibited.

“Children”: The Bill refers only to “children born.” The child before birth is not included.

“Free and Informed Consent”: Consent can be neither free nor informed if accurate definitions are not given. This is of special importance to vulnerable persons.

“Individuality”: Some bioethicists make “delayed personhood” arguments which claim that before “X” biological marker event there is no human “individual” and therefore the human embryo or foetus has a reduced moral status.

“Cloning”: At least eight varieties and techniques are not mentioned and are therefore not prohibited. The one technique that is mentioned is inaccurately described.

Inaccurate Definitions:

“Clone” : The only cloning procedure, Somatic Cell Nuclear Transfer (SCNT), referred to in the Bill is inaccurately defined. It is the opinion of the author that the real process of SCNT, accurately defined would therefore not be prohibited. The Bill therefore can be interpreted as prohibiting no form of human cloning at all.

“Chimera” : The definition given in the bill does not adequately distinguish between chimeras and hybrids. Other forms of human/non-human life are either omitted or mis-defined. These entities are often used in eugenic research.

“Embryo”: The definition given does not include a single-cell zygote. Again, no mention means no restrictions on research or other activities. The legislation also includes in the

definition of “embryo,” a “totipotent” cell. A “totipotent” cell is a stem cell derived from an early embryo. To define the cell as an embryo is a gross scientific error.

“In Vitro Embryo”: The Bill excludes protection for the embryo in a frozen or otherwise suspended state of development.

“Gene”: The legislation does not distinguish between RNA nucleotide sequences and DNA nucleotide sequences. Both are used in cell research.

“Genome”: as defined in the Bill does not include any RNA, especially that of non-human entities such as bacteria and viruses in which RNA is the only kind of genetic material found and which are used in cell research.

Campaign Life Coalition Critique:

In December 2003, Campaign Life Coalition issued a copy of its 22-page clause-by-clause examination, “A Final Critique of C-13,” to Senators.

The Final Critique summarised the bill’s essential philosophical flaw:

> *The bill is founded upon a materialistic philosophy that assumes a human being is no more than a biological machine, a collection of cells and biochemical functions. It presents a utilitarian concept of the value of an individual human being: that value derives from his or her usefulness to another, whether it be for disease therapies or the enjoyment of parenthood. Such a utilitarian ethics therefore misdefines “the common good” as the “greatest good (utility) for the greatest number in society.” It is not only a mistake, but it is academically incorrect for people to assume that utilitarianism, even in its bioethics form, is somehow “neutral”, and for that reason should be used in a multicultural, pluralistic, democratic society. It is not “neutral”; it is a normative ethics. Therefore, how can the Canadian government justify its use in public policy decision-making?*

Under this utilitarian ethic, the bill sanctions, and in places mandates the objectification of the human person. No other legislation has so concretely proposed a normative Canadian ethics based on an extreme form of materialistic utilitarianism as the accepted philosophy of our nation. This bill represents an event horizon in political philosophy.

Points brought forward by the Final Critique:

The legislation

- fails to affirm the rights of the child to be naturally conceived and born within the context of marriage.

- fails to acknowledge the primacy of the family as the fundamental unit of society.

- fails to acknowledge the humanity or even the existence of the child before birth.

- only mentions the well-being of children born; the child before birth is disregarded as is the well-being of future generations of children yet to be conceived.

- fails to define the terms “health,” “safety,” “dignity,” or “rights”.

- fails to regulate intracytoplasmic sperm injection which has been shown to be connected to genetic abnormalities in the child.

- fails to identify the role of parents with regard to assisted reproduction technologies or to recognize the rights of the father. It is not simply “persons” as individuals who are affected by the use of reproductive technologies, but families and therefore society as a whole.

- fails to recognize the primacy of the so-called, “traditional” family as the fundamental unit of society.

The Final Critique concluded:

> *In vitro fertilization has come upon Canadian society quietly and has grown into a multimillion dollar industry in a very short time. In that time there has been little public debate on the ethics of any of the procedures of artificial reproduction, and, until the introduction of C-13, no debate in Parliament. The many other ancillary procedures, such as cloning, developed by IVF research have also brought us to the point of a massive re-imagining of what it means to be human. IVF research has brought us cloning, genetic selection of children for desired traits, genetic manipulation of human beings through recombinant gene "therapy," rent-a-womb surrogacy, the manufacture of children as a luxury commodity for the wealthy. It has given impetus to the so-called New Eugenics in the foreseen ability to control the future of the human species. By its intrusion into the sanctuary of marriage, IVF has contributed to the disintegration of the family as the foundation of society.*
>
> *Bill C-13 encourages the growing perception that there is such a thing as a right to parenthood. If this idea is accepted, it necessitates the reduction of the child to the position of property. If a person has a right to be a parent, the withholding of any means, no matter how immoral, to become a parent, can be seen as an injustice. If there is a right to be a parent there must be a right to have a child upon whom to exercise the right to parenthood. If the child can be demanded as a right, then she is no longer a sovereign person with rights of her own; she is a thing upon whom another person's rights are exercised.*
>
> *By accepting IVF as a given in Canadian society, Bill C-13 gives the governmental stamp of approval to the reduction of the human person to a thing that may be demanded as a right, donated as research material, purchased, experimented upon, bought, sold or destroyed at will. It effectively abolishes the notion of personhood in Canadian law. It accepts as the law of the land the idea that a human being's moral status can be granted or withheld at the whim of another. Once C-13 has established that there is no*

such thing as a person in the embryonic stage, what is to stop the progress of this logic to abolish personhood, and therefore protection under the law, of a human being at any other stage of development, from childhood through to old age?

Bill C-13 fails spectacularly, even in its stated intention of prohibiting human cloning. What is not often understood is that the same research that has perfected IVF has brought us the spectre of human cloning. The two are inseparable and wherever IVF is allowed, cloning is sure to follow. The bill's evasiveness, ambiguity and scientific inaccuracy on the subject of cloning and the creation of embryos exclusively for experimentation, has opened the door to human cloning. What is worse, is that once the bill is passed the public perception of urgency to prohibit cloning will pass. The procedures used to create clones will quietly go on in research labs protected by the bill's faulty definitions and unhindered by any further calls for prohibition. In its attempts to regulate the IVF industry, it fails even to identify any of the grave ethical or medical problems associated with artificial methods of human procreation. It assumes a nationwide acceptance of its increasing mechanization and commodification.

Political authority must be obligated to protect the institution of the family upon which society is based. Civil law cannot grant approval to techniques of artificial procreation which, for the benefit of third parties (doctors, biologists, economic or governmental powers), takes away what is a right inherent in the relationship between spouses.

Law does more than merely create rules. The law is a teacher and the philosophy that is assumed and taught by bill C-13 is one that represents a danger to the sovereign rights, and the very lives, of all persons at any stage of human development, from the embryo, to the child, to sick and disabled, to the vulnerable elderly.

Part IV: The International Situation

1. Britain[91] - A Glance at the Future of Biotechnologies for the World

In the world of biotechnologies and utilitarian bioethics, the rule seems to be, “Where Britain leads, the world follows”. Britain was among the first countries in the world to make abortion legal, and was the first in the world to legalize the cloning of human beings for research. The nation that established the world’s modern concepts of democratic rights and freedoms has become a world leader in devising ways to withhold these from the unborn. Keeping a close eye on developments in British law is a good way of answering the question, “Where next?” for cloning, embryo research and related fields.

Britain pioneers IVF

In 1978, Louise Brown, the first child conceived outside a woman’s body to survive to birth was born on 25 July 1978 in Oldham, Greater Manchester. She was conceived in vitro after the development, by Patrick Steptoe, an obstetrician and gynaecologist and Robert Edwards, a physiologist, of the technique previously devised for use on farm animals.

In the same year and after the massive international controversy over Louise Brown’s conception, the British government established the Warnock committee to investigate IVF and embryo research, and to make recommendations for legislation.

The Warnock committee insisted that the beginning of human life was an ethical rather than a biological question and settled upon the limit of 14 days, a day before the appearance of the primitive streak (a precursor of the neural tube) in the embryo as the beginning of human life. This was in direct contradiction to the findings of the science of human embryology that states clearly, “Human development is a continuous process that begins when an ovum from a female is fertilized by a sperm from a male... a zygote

[91] Much of the information for this section was taken from documents provided by the Society for the Protection of Unborn Children (SPUC). “A Way of Life – Affirming a Pro-Life Culture in Northern Ireland” SPUC 2002. http://www.spuc.org.uk/ethics/wayoflife2.pdf

is the beginning of new human life"[92]. Despite this contradiction to the science, the 14-day limit, as recommended by bioethicists, has become the standard for most, if not all, legislation regarding the use of embryos for research around the world. The Warnock Committee reported that the decision was made arbitrarily and had no relation to the nature of the embryo. "We agreed that this was an area in which some precise decision must be taken, in order to allay public anxiety."[93]

The Warnock committee's report was released in 1984 and the 1990 Human Fertilisation and Embryology Act incorporated the committee's recommendations into law. The Act established the Human Fertilisation and Embryology Authority (HFEA) that creates guidelines for researchers based on what is allowed in the law and grants research licences.

By 1997, one in 80 children (1.2%) born in Britain was the result of IVF treatment.

In 2000, an audit of Britain's 118 IVF clinics revealed that frozen embryos had been destroyed as a result of power failures, or implanted into the wrong women as a result of mistakes in data collection. The audit by the Human Fertilisation and Embryology Authority (HFEA) found that electricity disruptions at "various" centres had led to the deaths of an undisclosed number of embryos in frozen storage. Errors in data collection led one former HFEA inspector to suggest that 1,000 IVF babies may have been implanted into the wrong women, leading to as many as 30 live births.

Legalized cloning

The first mammal, a successfully cloned using the somatic cell nuclear transfer technique was born on 5 July 1996. Professor Ian Wilmut and his team at the Roslin Institute, Edinburgh, had cultured 277 cloned sheep embryos for six days, after which

[92] The Developing Human, K L Moore, W B Saunders, 1988, page 1

[93] The Warnock Committee, Report of the Committee of Inquiry into Human Fertilisation and Embryology, London (1984), HMSO, p.60

29 of them which appeared to have developed normally to the blastocyst stage were implanted into surrogate ewes. 148 days later, Dolly was the only lamb to be born alive.

On 24 June 1999, the British Government called for a moratorium on human cloning and established the Expert Medical Group on Human Cloning (known as the Donaldson committee) under Professor Liam Donaldson, the government's chief medical officer. This committee's report made a distinction between reproductive human cloning (the transfer of any cloned human embryo into the uterus of a woman) and so-called therapeutic cloning (which it called cell nuclear replacement).

On 16 August 2000, the United Kingdom became the first country to authorize destructive research on cloned embryos. The department of health accepted all the recommendations in the Donaldson committee's report, and this was followed by votes in both houses of parliament to amend the Human Fertilisation and Embryology Act 1990 authorizing research on cloned human embryos for the treatment of "serious disease".

The Human Fertilisation and Embryology (Research Purposes) Regulations 2001, which came into force on 31 January 2001, added three grounds for research on human embryos to those which are authorized by the Human Fertilisation and Embryology Act 1990: increasing knowledge about the development of embryos; increasing knowledge about serious disease; enabling any such knowledge to be applied in developing treatments for serious disease. The measure did not mention either cloning or cell nuclear replacement.

On 7 September 2000 the European parliament passed a motion calling on the British government to review its stance on human embryo cloning and noted that "an attempt is being made to use linguistic sleight of hand to erode the moral significance of human cloning". After the vote in the House of Commons, Edelgard Bulmahn, Germany's science minister, commented: "We are united with all other European Union countries that the cloning of embryos steps over ethical and moral boundaries."

On 15 December 2000, Yvette Cooper, the Public Health Minister, told the House of Commons, “Between 1991 and 1998, more than 750,000 embryos were created through IVF. Some 48,000 were donated for use in research and 237,000 were destroyed. The rest were either used in treatment or held for future use.”

Under the Act, IVF embryos cannot be experimented upon without the consent of their biological parents. After 10 years the embryos must be destroyed unless the parents consent to their continued storage.

In November 2001 the British government passed additional legislation specifically allowing human cloning for “therapeutic” purposes and banning the implantation of cloned human embryos, requiring them to be killed before 14 days. The Human Reproductive Cloning Act 2001 that allows “therapeutic cloning” under license from the HFEA. The first licence was granted on August 11, 2004 to researchers at the University of Newcastle to allow them to investigate treatments for diabetes, Parkinson's disease and Alzheimer's disease.

In January 2006, Professor Ian Wilmut, the researcher who created Dolly the cloned sheep, applied to the HFEA for permission to create clones from human and rabbit tissue.[94] In November 2006, a team of British scientists from Kings College London and the North East England Stem Cell Institute (NESCI) asked the HFEA for permission to begin creating clones made from cow ova and human nuclei.[95]

The Labour government briefly considered banning the creation of mixed species cloned embryos, but backed away from a ban after a group of 45 scientists, ethicists and politicians published an open letter in January 2007 saying that a ban would hold back the advancement of British science.

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[94] http://www.lifesite.net/ldn/2006/jan/06011306.html

[95] http://www.lifesite.net/ldn/2006/nov/06110707.html

New Legislation – The "Ratchet Effect"

Despite calls from the research community to ban the procedure, in December 2006, the British government tabled draft legislation that would allow the creation of human/animal hybrid clones as well as codifying a host of procedures previously allowed on a case-by-case basis by the HFEA. As of this writing, the legislation is awaiting examination by a committee and the public and a vote in Parliament.

The draft legislation codified in law the permissions given individually by the HFEA over its 17 years of existence. Anthony Ozimic of the Society for the Protection of Unborn Children described this as a "one-way ratchet effect" in which no reconsideration of the procedures already allowed can been made.

Procedures allowed under the Draft Bill would include the creation of cloned human embryos; the eugenic manipulation of clones and IVF embryos to acquire desired genetic traits; the creation of genetically selected children to be used as tissue donors; the creation of human-animal hybrid embryos for experimentation. The proposed law would abolish the requirement for a father for in vitro fertilization; it allows the screening of embryos for "serious medical conditions" and their creation as a source of genetically matched tissue for treatment of siblings.

The Society for the Protection of Unborn Children submitted a brief to the Joint Committee calling the Draft Bill "unsatisfactory"[96]. SPUC said that although a societal consensus has yet to be reached on these procedures, both the reproductive technology sector and elements of the research community have financial interests in promoting changes that are evident in The Draft Bill.

SPUC laid out the pro-life objections to the Draft Bill saying it:

- expands measures that entail the destruction of human life at its earliest and most vulnerable stage;
- manifests an eugenic mentality which underlies some of the its key proposals;

[96] http://www.spuc.org.uk/lobbying/HTEbillsub.pdf

- manifests arbitrariness in its applied limits;
- accelerates the waning respect for human life that is marking scientific endeavours in the modern biotechnological era;
- fails to provide the leadership necessary for ethically sound goals to be pursued;
- has been devised on the basis of a one-way ratchet on the use of human embryos in research involving their destruction, and only changes that will extend this use will be considered;
- ignores critical scientific and ethical questions in what appears to be an attempt to allay public unease by the promise of tight regulations;
- by endorsing the destruction of human life at its most vulnerable stage, and seeking to extend the circumstances and ultimately the number of embryos so destroyed, is operating from a utilitarian ethic that is prepared to pursue potential goods such as health - that may never be realised – at the expense of the most fundamental good of human life itself;
- is a complex mix of acquiescence to scientific advances, commitment to various and at times conflicting ethics, inconsistent application of regulations and economically rationalist restructuring.

Where next? The Joint Committee recommends deregulation of embryo research and cloning

In August 2007, the Joint Committee on the draft Human Tissue and Embryos Bill issued a report that called for the HFEA, or other non-Parliamentary regulator, to have power to exempt whole areas of research from the need for a license. In these areas, scientists would have total freedom to create, manipulate and destroy any number of human embryos.

The Committee acknowledged that the bill lacked the foundations that provided a "partial ethical framework" for the 1990 Human Fertilisation and Embryology Act. The report suggested that the legislation itself should embody no ethical principle other than that the “regulator is king”. The report proposes that the government should be able to override the regulator's decisions but only at the regulator's own invitation.

The Committee report also recommended that if Parliament agrees to the creation of inter-species embryos, wide powers for the creation and use of such human-animal hybrids and chimeras should be given.

The Committee proposed a new definition of "inter-species embryo" which means any cross-fertilised embryo (human-animal) which does not have a full complement of 23 human chromosomes is not regarded as an inter-species embryo at all. An embryo made by taking a human sperm, deactivating one chromosome - or part of a chromosome - and fertilising a ewe's or sow's ovum, is not an "inter-species embryo" as defined, and so would not come under the law. The committee recommended that the HFEA - not the courts or Parliament - should have the power to interpret the definition of “inter-species” embryos.

Although such an embryo might have the potential to develop human characteristics, under the committee’s recommendation, scientists would be free to do almost anything with it as long as it was not implanted in a woman's womb. Implantation in an animal or artificial womb is not prohibited.

The report supported the repeal of the law banning so-called “reproductive cloning” - that is, transfer of cloned embryos to the womb. Instead certain embryos will be categorised as "permitted" embryos (permitted to be transferred to the womb). At present, cloned embryos would not be "permitted". The decision would be left to the regulator, with no opportunity for a debate in Parliament and the public scrutiny entailed.

Part IV: The International Situation

2. Europe

World policies on human or reproductive cloning range from partial prohibition to no policies on record. France, Germany, and the Russian Federation have bans in place that ostensibly [97] prohibit human cloning for any purpose. Fifteen countries, including Japan, the United Kingdom, and Israel, have banned human cloning for "reproductive" purposes, but permit the creation of clones for research and require that they be killed before certain arbitrary limits of development. A few countries such as Hungary and Poland do not explicitly prohibit embryonic stem cell research or therapeutic cloning, partially because their legislation was drafted before embryonic stem cells were first produced (1998). Many other countries, similar to the United States, have yet to pass any official legislation concerning human cloning.

The European Union

In January 1998, 19 countries of the European Union signed an agreement that prohibits the cloning of human embryos for "reproductive" purposes. The clause that was shortly to be added to the European Convention on Human Rights and Biomedicine banned "any intervention seeking to create human beings genetically identical to another human being, whether living or dead."

The European Convention on Human Rights and Biomedicine (Article 3) prohibits the cloning of human beings, but only for "reproductive purposes." As with most countries of the world, the EU accepted the false distinction between "therapeutic" and "reproductive" cloning. The creation of cloned human embryos to be used for research is not prohibited under the convention.

[97] "ostensibly prohibit" - Legislative "cloning bans", being largely drafted by bioethicists and research lobbyists without reference to international standards of scientific nomenclature have been found by experts to frequently contain ambiguous or erroneous definitions that some have contested would render null prohibitions against the procedures thus mis-defined. This use of indefinite and inaccurate terminology has created immense confusion even among those sincerely concerned with prohibiting cloning and embryo research. Whether the cloning prohibitions of these or other countries have been rendered ineffective for these reasons is beyond the scope of this work, but remains a matter of serious concern to pro-life people and warrants continued close monitoring.

As with most countries passing “cloning bans”, in the European law, “human being” meant a child brought to the gestational age normal for birth. The clause, therefore, accepts the widely disseminated falsehood that banning “human cloning” meant prohibiting only the creation of cloned babies for “reproductive” purposes, but allowed the creation of the same cloned children to be killed at an earlier stage for research purposes.

The original 19 signatories were Denmark, Estonia, Finland, France, Greece, Iceland, Italy, Latvia, Luxembourg, Moldova, Norway, Portugal, Romania, San Marino, Slovenia, Spain, Sweden, Macedonia and Turkey.

Britain and Germany -- two of Europe's biggest nations -- did not sign the protocol. Germany said the measure is weaker than German law that forbids all research on human embryos -- a reaction to Nazi genetic engineering experiments. Britain was shortly to grant permission for all human cloning experiments requested by researchers. Germany maintained opposition to the EU’s flawed cloning prohibition until July, 2006 when, together with Slovenia, the German government accepted EU assurances that no EU money would directly be spent on projects in which human embryos would be destroyed.

The EU announced the same year that it had allotted €37bn to an omnibus science budget in which revised rules allowed for some human embryonic stem cell research, in what were called by EU ministers as undefined “subsequent steps” to be taken in the future.

The European Union remains one of the major lobbying forces in favour of using embryos for medical research. In June 2002 former Member of the European Parliament for Ireland, Dana Rosemary Scallon, warned that the European Union was pressuring the Irish Government to support funding for destructive research on human

embryos. Scallon revealed that people at the highest level in Bertie Ahern's government are being pushed to assist the use of EU money for experimentation with embryos.

It is essential to carefully monitor developments in European Union law since under various agreements the laws of the various member states are frequently subject to revision.

Austria [98]

The law [99] does not explicitly prohibit the cloning of human beings, but it limits research on human embryos (defined as "developable cells"). Its central principle is that reproductive medicine is acceptable only within a stable heterosexual relationship for the purpose of reproduction.

Article 9 states that fertilized human oocytes (embryos) and cells derived therefrom may not be used for purposes other than medically assisted reproduction, and any intervention into the germline is strictly prohibited. Any violation or attempt at violation is subject to administrative or criminal prosecution.

Belgium

Prohibits only "reproductive" cloning, allows the creation of embryos for research if "the objective of the research cannot be achieved by research on excess embryos and in as much as the conditions of the present law are met."

The law further states, "It is forbidden to effect research or treatments with a eugenic purpose, in other words focused on the selection or amplification of non pathological genetic characteristics of the human species."

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[98] Information for much of this section was taken from a research document compiled for the website of Global Lawyers and Physicians, a non-profit non-governmental organization that focuses on health and human rights issues. http://www.glphr.org/genetic/europe2-7.htm

[99] "Federal Law Regulating Medically Assisted Procreation (The Reproductive Medicine Law), Amending the General Civil Code" (1992):

Denmark

The act on Medically Assisted Procreation in connection with medical treatment, diagnosis and research" (June 1997, amended June 2003) forbids research "on human reproductive cloning and somatic cell nuclear transfer (therapeutic cloning)".
Under the Act on a Scientific, Ethical Committee System and the Handling of Biomedical Research Projects" (1992) "The following experiments shall be prohibited:

1. experiments whose purpose is to enable the production of genetically identical (full gestational age) human beings;
2. experiments whose purpose is to enable the production of (full gestational age) human beings by the fusion of genetically different embryos or parts of embryos prior to their implantation in the uterus;
3. experiments whose purpose is to enable the production of (full gestational age) living human beings who are hybrids with a genetic constitution including components from other species; and
4. experiments whose purpose is to enable the development of (full gestational age) human beings in the uterus of another species."

France

Bioethics Law on Respect for the Human Body and Law, Donation and Use of Elements and Products of the Human Body, Medically Assisted Procreation, and Prenatal Diagnosis. July 2004, amended July 1994.

The bioethics legislation and its amendments specifically prohibit human cloning for reproductive and therapeutic purposes, germline gene therapy and the creation of embryos purely for research purposes.

Human reproductive cloning is considered a "crime against the human race" and has been criminalized with jail sentences of up to 20 years and the imposition of fines; research or therapeutic cloning is punishable with up to 7 years in prison and fines.

Finland

"The Act on Medical Research, No. 488/1999" (1999). Conditions governing research involving embryos: Research on embryos outside a woman's body may be carried out only by agencies that have been granted the appropriate licence by the National Authority for Medicolegal Affairs. Medical research shall be permitted on embryos only if no more than 14 days have passed from their formation. Research on embryos outside a woman's body may not be undertaken without the written consent of the persons who donated the gametes.

The production of embryos exclusively for the purpose of research shall be forbidden. Embryos that have been used for research may not be implanted in a human body or be kept alive for longer than 14 days from their formation, not including any time during which they have been kept frozen.

Research may use embryos that have been stored for up to 15 years, after which the embryos must be destroyed. Research on embryos and gametes for the purpose of developing procedures for modifying hereditary properties shall be prohibited, unless the research is for the purpose of curing or preventing a serious hereditary disease.

Germany

Germany, in most other ways regarded as the most liberal of states on most social issues, retains strong opposition to bioengineering. Germans of all political persuasions are widely opposed to scientific research that tends to manipulate or exploit human life.

"Federal Embryo Protection Law" (1990) stipulates that any person who "artificially causes a human embryo to develop with the same genetic information as another embryo, foetus, living person, or deceased person shall be punished by up to five years' imprisonment or by a fine. The same penalty applies to the transfer of embryos into a woman.

The law prohibits germline alteration and the use of human germ cell with artificially modified genetic information for fertilization, the creation of chimeras and hybrids or their implantation in a woman or an animal.

For the purpose of the German law, the term "embryo" is defined as the “human egg cell, fertilized and capable of development, from the time of fusion of the nuclei, as well as each totipotent cell removed from an embryo that is capable, in the presence of other necessary conditions, of dividing and developing into an individual”

In August 2004, in response to the permission given by the UK’s Human Fertilisation and Embryology Authority (HFEA), the German Medical Association and leading political parties called on the German government to take a firmer stand within the European Union against cloning. German Medical Association spokesman, Jörg-Dietrich Hoppe, appealed to the government: "We can't allow embryos to be harvested like raw materials.” Frank Ulrich Montgomery, chairman of the Marburger Association of Doctors said, “The indivisibility of human rights are being eroded under the blanket of research freedom.” Wolfgang Wodarg - a member of the ruling Social Democratic Party and chairman of Germany's official bio-ethics commission - called Britain's decision a "catastrophe".

Human cloning remains illegal in Germany; many feel that the country's ethical stand on cloning should be more vigorous, and that cloning should be banned throughout the European Union.

Iceland

Research on embryos is entirely prohibited under the Artificial Fertilisation Act May 1996. Experiments and operations on embryos are permitted:

- to carry out research on embryos for research into in vitro fertilisation treatment
- if the intention is to diagnose hereditary diseases in the embryos
- if the purpose is to advance the treatment of infertility, or
- if the purpose is to improve understanding of the causes of congenital

- diseases and miscarriages.

The law prohibits:

- the cultivation or production of embryos solely for research purposes;
- for more than 14 days outside the body or once the primitive streak has appeared;
- the transplanting of human embryos into animals, and
- cloning.

Ireland

Experiments on human clones are prohibited under the Irish constitution. Article 40: "The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right." The Constitution is interpreted as an implicit prohibition on human cloning.

Italy

"Assisted Medical Procreation Law" (February 2004). Article 13 prohibits the creation of embryos solely for research purposes or any other purpose not explicitly authorized in the law. It further prohibits the "selection, manipulation or any other procedure directed at altering the genetic patrimony/heritage of the embryo or the gamete. This is to predetermine their genetic characteristics, with the exception of diagnostic and therapeutic purposes. The law also forbids "cloning interventions by means of nuclear transfer or early embryo splitting whether for reproductive or therapeutic purposes.

The Netherlands

"The Embryos Act" (July 2002). The Embryo Act bans the production of embryos purely for research purposes. Scientific research using embryos are allowed if "the results is expected to yield must be of medical importance". If there are alternative methods, they must be used. All research programmes must be approved by the Central Committee

on Research involving Human Subjects. The Embryos Act prohibits human "reproductive cloning".

Norway

"The Biotechnology Law" (December 2003, amended December 2002)
Research on fertilized eggs, human embryos, and cell lines cultured from fertilized eggs or human embryos shall be prohibited. The law prohibits the production of human embryos by cloning.

It shall be prohibited:

- to produce human embryos by cloning;
- to carry out research on cell lines cultured from human embryos produced by cloning; and
- to produce embryos by cloning through the introduction of heritable material from a human being into an egg cell of an animal.

Cloning means techniques for producing heritable identical copies."

Poland

"Law on Family Planning, Protection of Human Foetuses, and the Conditions under which Pregnancy Termination is Possible" (January 1993). The law prohibits human reproductive cloning. In July 2006, the Polish parliament issued a resolution against research using human embryos, in response to the European Union's vote to provide funding for embryonic stem cell research. The Sejm, the lower chamber of the Polish parliament, issued the resolution, which passed with a strong majority of 341 votes in favour and only 47 against. 20 votes were withheld.

The resolution stated: "Sejm of the Republic of Poland points out that those reprehensible practices (human embryo experimentation) are inconsistent with Polish law. [The destruction] of human embryos purposefully to receive stem cells is against

the Polish Constitution, Chapter II, article 38, which states 'The Republic of Poland shall ensure the legal protection of the life of every human being.'"

Human embryo experimentation would violate article 157 of Poland's Penal Code, which protects human life from the moment of conception. Further, it would be inadmissible under the Medical Ethic Code.

Russian Federation

Law on the Temporary Prohibition of Human Cloning" (April 2002). The creation of "a human being, genetically identical to another one, dead or alive, by means of implantation of a human body cell into a female gamete preliminary deprived of it nucleus" is subject to a temporary 5-year ban.

The law also prohibits import and export of human cloned embryos for the same period. Persons violating the law will be prosecuted in accordance with the federal legislation. However, neither the Criminal nor Administrative Code provides punishment for cloning acts.

Slovakia

"The Health Care Law" (1994). "Any intervention seeking to create a human being genetically identical to another human being, whether living or dead, is prohibited."

Research cloning is implicitly prohibited under Article 42.3c) "research without medical indication is not permitted on human embryos and foetuses."

Slovak Penal Code (Amended September 2003). "Any person who performs any intervention seeking to create a human being in any stage of development genetically identical to another human being, whether living or dead, shall be sentenced from 3 to 8 years of imprisonment or shall be punished by a prohibition of activity or pecuniary penalty."

Slovenia

“The Law on Medically Assisted Reproduction” (2001). Penal Code (2002). Human cloning for reproductive, research or therapeutic purposes is forbidden as are inheritable genetic modification procedures.

Spain

The election in March 2004 of a government headed by the Spanish Socialist Workers' Party (PSOE), Spain has enacted a host of anti-life and anti-family measures. Since allowing, in 2003, the use of “spare” embryos in medical research, the country has allowed sex selection of embryos in IVF facilities. In July 2005, Health Minister, Elena Salgado said the government intended to enact legislation allowing cloning for “non-reproductive” purposes.

Switzerland

Federal Act on Research on Surplus Embryos and Embryonic Stem Cells (Embryonic Research Act). (Approved by Referendum November 2004). The Act prohibits both the creation of embryos for research purposes (therapeutic cloning) and cloning for reproductive purposes. “Human beings shall be protected against abuse with regard to medically assisted procreation and genetic engineering.

“The Confederation shall legislate on the use of the human germline and genetic heritage. In doing so, it shall ensure that human dignity, personhood, and the family are protected and that the following principles are respected: any form of cloning and any intervention involving the genetic heritage of human gametes and embryos is prohibited.

“Recourse to medically assisted procreation methods may be authorized only in cases where sterility or the danger of the transmission of a serious disease cannot be averted in any other way, and not for the development of certain qualities in the child or for research; the fertilization of human oocytes outside the body of a woman shall be authorized only under the conditions laid down by law; only the number of human oocytes that may be immediately implanted may be developed to the embryo stage

outside the body of a woman. There may be no trade involving human germline material or products resulting from embryos."

"Federal Act on Research on Surplus Embryos and Embryonic Stem Cells(Embryonic Research Act)," (April 2004). Under the Act, it is forbidden to:

- produce an embryo for research purposes, produce stem cells from such an embryo or use such stem cells;
- modify the hereditary patrimony of germ cells, produce embryonic stem cells from an embryo whose germline was modified, or use such cells;
- create a clone, a chimera or a hybrid, produce embryonic stem cells from a clone, a chimera or a hybrid, or use such cells;
- develop a parthenote[100], produce embryonic stem cells from a parthenote, or use such cells;
- import or export an embryo of the kind described in a. or b., a clone, a chimera, a hybrid or a parthenote."

[100] a cell resulting from parthenogenesis

Part IV: The International Situation

3. The United States

The United States has yet to pass federal legislation of the type that governs embryo research and cloning in Great Britain and Canada. Since August 2001, when President George W. Bush decided to limit federally funded research to that conducted on embryonic stem cell lines created before August 2001, a number of attempts have been made and failed at the federal level.

While there is no federal law banning the creation of cloned embryos, federal funding of research involving cloning "for the purpose of reproduction or research" is prohibited. The federal Food and Drug Administration (FDA) has claimed authority over the regulation of human cloning technology as an investigational new drug and stated that they would not approve any projects involving human cloning for safety reasons. Congress has not passed legislation confirming the FDA's authority to prohibit cloning.

The necessity of accurate scientific definitions has become clear with state legislation that allows cloning, beginning in New Jersey, while at the same time claiming to prohibit it. Such legislation has been called "clone-and-kill" bills by pro-life observers in the US. Typically, clone-and-kill legislation is that which allows the creation of embryos by cloning but specifies that the resulting embryo must be killed before a certain point, usually 14 days[101]. Clone-and-kill legislation usually claims to be "ethical" by the standards of secular bioethics[102], because it prohibits any attempt to bring the clone to

[101] "14 days" - The ubiquity in legislation around the world of the 14 day cut-off for cloning and embryo research is evidence that the same bioethicists, who have admitted that the limit is arbitrary, have, through international conferences, been the primary influence in the creation of laws governing embryo research. The 14-day limit is usually connected to the presumed point at which the embryo develops the "primitive streak" that is the beginning of development of the spinal structures. The development of the primitive streak is taken by bioethicists to signify the beginning of a unique, "potential" human being. This presumption is one developed for the purpose of finding an "ethical framework" that would allow embryo research, and is vigorously denied by experts and texts in human embryology.

[102] See Glossary of Philosophical Terms: "Principlism"

full gestational age[103] ("reproductive cloning"). Usually there is an attempt by supporting legislators to convince the public that the legislation is a prohibition of cloning, generally by use of misleading or vague terminology. The language used in these bills can serve as an education in what one EU legislator called the "linguistic sleight of hand" that is being employed "to erode the moral significance of human cloning".

At the state level, however, the legislative situation varies widely. Generally, statutes in California, Connecticut, Maryland, Massachusetts and New Jersey and an Executive Order in Illinois and Missouri encourage embryonic stem cell research. South Dakota strictly forbids research on any embryos.

Virginia's law may ban research on cloned embryos, but the statute may leave room for interpretation because human being is not defined.

Louisiana is the only state that specifically prohibits research on in vitro fertilized (IVF) embryos. Illinois and Michigan also prohibit research on live embryos. Finally, Arkansas, Indiana, Iowa, Michigan, North Dakota and South Dakota prohibit research on cloned embryos.

State-by-state overview [104]

Arizona: bans the use of public monies for "reproductive" or therapeutic cloning.

Arkansas: Prohibits therapeutic and "reproductive" cloning; may not ship, transfer or receive the product of human cloning; human cloning is punishable as a Class C felony and by a fine of not less than $250,000 or twice the amount of pecuniary gain that is received by the person or entity, which ever is greater

[103] For more on the false distinction between "reproductive" and "therapeutic" cloning, see Part II section 3 of this text: "Misdirections and Evasions: Common Media and Bioethics Euphemisms and Red Herrings"

[104] Information in this section has been taken from summaries provided by the National Conference of State Legislatures, a bipartisan organization that provides legislators with research, and technical assistance on pressing state issues. The information presented here is dated January 2007. http://www.ncsl.org/programs/health/genetics/embfet.htm

California: Prohibits “reproductive” cloning; permits cloning for research; provides for the revocation of licenses issued to businesses for violations relating to human cloning; prohibits the purchase or sale of ovum, zygote, embryo, or fetus for the purpose of cloning human beings; establishes civil penalties.

Connecticut: Prohibits “reproductive” cloning, permits cloning for research; punishable by not more than one hundred thousand dollars or imprisonment for not more than ten years, or both.

Indiana: Prohibits “reproductive” and therapeutic cloning; allows for the revocation of a hospital's license involved in cloning; specifies that public funds may not be used for cloning; prohibits the sale of a human ovum, zygote, embryo or fetus.

Iowa: Prohibits human cloning for any purpose; prohibits transfer or receipt of a cloned human embryo for any purpose, or of any oocyte, human embryo, fetus, or human somatic cell, for the purpose of human cloning; human cloning punishable as Class C felony; shipping or receiving punishable as aggravated misdemeanor; if violation of the law results in pecuniary gain, then the individual is liable for twice the amount of gross gain; a violation is grounds for revoking licensure or denying or revoking certification for a trade or occupation.

Maryland: Prohibits “reproductive” cloning; prohibits donation of oocytes for state-funded stem cell research but specificies that the law should not be construed to prohibit therapeutic cloning; prohibits purchase, sale, transfer or obtaining unused material created for in vitro fertilization that is donated to research; prohibits giving valuable consideration to another person to encourage the creation of in vitro fertilization materials solely for the purpose of research; punishable by up to three years in prison; a maximum fine of $50,000 or both.

Massachusetts: Prohibits “reproductive” cloning; permits cloning for research; prohibits a person from purchasing, selling, transfering, or obtaining a human embryonic, gametic or cadaveric tissue for “reproductive” cloning; punishable by imprisonment in jail or correctional facility for not less than five years or more than ten years or by or by imprisonment in state prison for not more than ten year or by a fine of up to one million dollars; in addition a person who performs “reproductive” cloning and derives financial profit may be ordered to pay profits to Commonwealth.

Michigan: Prohibits human cloning for any purpose and prohibits the use of state funds for human cloning; establishes civil and criminal penalties.

Missouri: Missouri Amendment Two amended the Missouri Constitution to allow researchers to conduct any research permitted under federal law without any interference from the state legislature. It was approved by a ballot measure in the mid-term elections on November 7, 2006.

New Jersey: Permits cloning for research; prohibits “reproductive” cloning, which is punishable as a crime in the first degree; prohibits sale or purchase, but not donation, or embryonic or fetal tissue, which is punishable as a crime in the third degree and a fine of up to $50,000.

North Dakota: Prohibits “reproductive” and therapeutic cloning; transfer or receipt of the product of human cloning; transfer or receipt, in whole or in part, any oocyte, human embryo, human fetus, or human somatic cell, for the purpose of human cloning; cloning or attempt to clone punishable as a class C felony; shipping or receiving violations punishable as class A misdemeanor.

Rhode Island: Prohibits human cloning for the purpose of initiating a pregnancy; for a corporation, firm, clinic, hospital, laboratory, or research facility, punishable by a civil penalty punishable by fine of not more than $1,000,000, or in the event of pecuniary gain, twice the amount of gross gain, whichever is greater; for an individual or an

employee of the firm, clinic, hospital, laboratory, or research facility acting without the authorization of the firm, clinic, hospital, or research facility, punishable by a civil penalty punishable by fine of not more than $250,000, or in the event of pecuniary gain, twice the amount of gross gain, whichever is greater.

South Dakota: Prohibits “reproductive” and therapeutic cloning; transfer or receipt of the product of human cloning; transfer or receipt, in whole or in part, any oocyte, human embryo, human fetus, or human somatic cell, for the purpose of human cloning; cloning or attempt to clone is punishable as a felony and a civil penalty of two thousand dollars or twice the amount of gross gain.

Virginia: Prohibits “reproductive” cloning; may prohibit therapeutic cloning but it is unclear because human being is not defined in the definition of human cloning; human cloning defined as the creation of or attempt to create a human being by transferring the nucleus from a human cell from whatever source into an oocyte from which the nucleus has been removed; also prohibits the implantation or attempted implantation of the product of somatic cell nuclear transfer into an uterine environment so as to initiate a pregnancy; the possession of the product of human cloning; and the shipping or receiving of the product of a somatic cell nuclear transfer in commerce for the purpose of implantation of such product into an uterine environment so as to initiate a pregnancy. The law establishes civil penalty not to exceed $50,000 for each incident.

Part IV: The International Situation

4. Central and South America

Largely due to the area's strongly Catholic culture, the situation with regards to the life issues in general in Central and South America is considerably more hopeful than in North America, Britain or Europe. Some countries This position of cultural strength combined with the poverty of the Latin American nations and their dependence on international aid, however, has made them particular targets of pro-abortion and anti-Catholic elements in the international community.

An international abortion lobby group, the Center for Reproductive Rights[105], admitted in 2006 that they and similar groups were counting on the courts as a means to by-pass legislatures to bring legalized abortion into the mainly Catholic countries of South and Central America. Most of these groups are funded by large international donors such as the Hewlett Packard Foundation, the Bill and Melinda Gates Foundation, the Ford Foundation and a host of others. They enjoy a great deal of freedom and support through their recognition by such international bodies as the United Nations.

In their 2006 press conference, the Center for Reproductive Rights group highlighted the notorious "Paulina" case in Mexico as an example of the method of using a single court case to create a wedge in a country's abortion restrictions. The Mexican case was built around the 1999 rape of a then-13 year-old Mexican girl, Paulina del Carmen Jacinto Ramírez. Paulina and her family were convinced by doctors and pro-life counselors at Mexicali's General Hospital not to abort her child. Pro-life groups helped Paulina and her family with child care expenses.

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[105] US Abortion Activists Forcing Abortion on Mexico through Courts
http://www.lifesite.net/ldn/2006/mar/06030808.html

See also LifeSiteNews.com's three-part series on the use of such "hard cases" by abortion lobbyists to undermine legislation that protects the unborn.

Pro-Abortion Group in Nicaragua Caught Aiding Rapist Escape Criminal Investigation
http://www.lifesite.net/ldn/2007/aug/07081602.html

Six months after the birth, Paulina was approached by feminists affiliated with the international abortion lobby who had launched a human rights complaint claiming that Paulina had been denied her "right" to an abortion. In March 2006, the Center for Reproductive Law and Policy, the legal arm of the U.S. pro-abortion movement, won a case at the Inter-American Commission on Human Rights and the Mexican government agreed to guarantee access to abortion in the case of pregnancies due to rape.

This small example serves to illustrate the determination of groups whose stated goals are to expand abortion by any means fair or foul and to sever the traditional ties of the people to the Catholic Church[106], which remains the largest provider of charitable care in the areas as well as being the strongest voice for the protection of the unborn.

The effort to disestablish the Catholic Church does not stop at abortion but expands to other areas including the Early Life Issues. Promotion in Latin America of contraception, sterilization, abortion drugs such as RU 486, artificial reproduction, cloning and stem cell research are of particular interest to these groups, on all of which the Church is the primary locus of opposition.

Mexico, Brazil, Venezuela, Chile, Costa Rica, Colombia, Guatemala, Peru, El Salvador, Bolivia, Uruguay, Argentina, Ecuador, Honduras and Nicaragua, all countries whose populations hold strongly pro-life views, have all been under heavy pressure, including threats of whithholding international aid, to bring their laws into line with the prevailing pro-abortion legal philosophies in the US.

In a report[107] on the advance of the abortion agenda in Latin America for the Population Research Institute, Joseph A. D'Agostino wrote, “A tyrannical global revolution in law is underway, and the leaders of this international movement have targeted the small,

[106] See “The UN Quietly Wages War on Religion” http://www.lifesite.net/ldn/2001/aug/010820a.html

[107] “Pro-Abortion Court Revolution Targets Colombia” September 30, 2005 http://www.pop.org/main.cfm?EID=866

turbulent country of Colombia. By their own admission, they want Colombia to be on the leading edge of legalizing abortion in Latin America."

Argentina[108]**:** The Argentine Constitution recognizes the humanity of the unborn child "from the moment of conception." In 2001, Argentina was one of a list of countries that proposed a resolution to the United Nations to outlaw all forms of human cloning. Embryonic stem cell research is permitted, but all forms of cloning ("reproductive" and therapeutic) are banned. The law specifically states that experiments concerning cloning of human cells in order to generate human beings are prohibited. In May 2004,

Brazil: Embryonic stem cell research as well as therapeutic and "reproductive" cloning is banned. The current policy prohibits the genetic manipulation of the germline (or a gene which can be passed to ones offspring) and intervention of the human genetic material in vivo. As of 1995, the Brazilian Biosafety Technical Commission of the Ministry of Science and Technology concluded that this law inherently bans human cloning. The law is currently under review.

Chile: Embryonic stem cell research is not specifically prohibited, but therapeutic and "reproductive" cloning and the funding of such activities are as of 1993. This law is currently under review. The law states that the cloning of human beings and interventions which results in the creation of a human being genetically identical to another is prohibited.

Colombia: Embryonic stem cell research and therapeutic cloning are permitted, but "reproductive" cloning is banned. The criminal code (2000) prohibits fertilization of a human ovum with intent other than procreation and prohibits genetic manipulation for the purpose of "reproductive" cloning. The code does allow the fertilization of human ova for research and diagnostic purposes, if they is a therapeutic goal.

[108] Information in this section was taken from "World Human Cloning Policies" By Kathryn Wheat and Kirstin Matthews, Ph.D. at Rice University. http://www.ruf.rice.edu/~neal/stemcell/World.pdf

Costa Rica: Embryonic stem cell research as well as therapeutic and “reproductive” cloning is banned. Any manipulation of an embryo's genetic code is prohibited, as well as any experimentation on the embryo (two laws as of 1995 and 1998). Costa Rica has led the Latin American resistance to foreign pressure to introduce pro-abortion and other forms of anti-life legislation. In February 2004, Dr. Abel Pacheco, President of the Republic of Costa Rica, was awarded the Kolbe Prize for Peace by the Catholic Family & Human Rights Institute (C-FAM), a UN-based nongovernmental organization.

Ecuador: Embryonic stem cell research as well as therapeutic and “reproductive” cloning is banned. Research on human embryos (and therefore cloning) is prohibited as of June 1998.

Mexico: Embryonic stem cell research and therapeutic cloning are permitted, but “reproductive” cloning is banned (the laws were just amended in 2004).

Panama: Embryonic stem cell research is not specifically prohibited, but therapeutic and “reproductive” cloning and the funding of such activities are as of 2004.

Peru: Embryonic stem cell research is not specifically prohibited, “reproductive” cloning are banned. Fertilization of a human ovum with intent other than procreation is prohibited, as well as human cloning (General Health Law, 1997).

Uruguay: Embryonic stem cell research is not specifically prohibited, but therapeutic and “reproductive” cloning are as of 2003.

Venezuela: The law states that human cloning is prohibited, as is manipulating human cells or genetic materials by cloning in order to create an identical human being, pre-embryo (blastocyst), or embryo.

Part IV: The International Situation

5. Africa and the Middle East

Israel[109]**:** Embryonic stem cell research and therapeutic cloning is permitted, but "reproductive" cloning is banned. Human "reproductive" cloning and germline genetic engineering is prohibited. The law was amended on March 2004, Prohibition of Genetic Interventions (Human Cloning and Genetic Manipulations of Reproductive Cells).

"Law 5759-1999 - Prohibition of Genetic Intervention (Human Cloning and Genetic Manipulation of Reproductive Cells)" 1999, amended March 2004. "The purpose of this Law is to determine a prescribed period of five years during which no kind of genetic intervention shall be performed on human beings in order to examine the moral, legal, social and scientific aspects of such kinds of intervention and the implications of such for human dignity. Throughout the period during which this Law is in force, no person shall perform any act of intervention in the cells of any person with one of the following purposes: (1) Human cloning; (2) Causing the creation of a person by use of reproductive cells that have undergone a permanent intentional genetic modification (Germ Line Gene Therapy)."

Turkey: Embryonic stem cell research is not specifically prohibited. Therapeutic cloning is allowed, but "reproductive" cloning is banned. (as of 1996).

South Africa: Embryonic stem cell research is permitted, but all forms of cloning ("reproductive" and therapeutic) are banned. The law specifically states that the cloning of human cells is prohibited, and genetic manipulation of gametes or zygotes outside of the body is also prohibited. "Law on Human Tissue" (1983) 39A: "Genetic manipulation of gametes or zygotes is not permitted… no provision of this Act shall be so construed as to permit genetic manipulation outside the human body of gametes or zygotes."

[109] Information in this section was taken from "World Human Cloning Policies" By Kathryn Wheat and Kirstin Matthews, Ph.D. at Rice University. http://www.ruf.rice.edu/~neal/stemcell/World.pdf . And the Database of Global Policies on Human Cloning and Germ-line engineering, a project of Global Lawyers and Physicians, a non-governmental organization focusing on health and human rights issues with respect to the Nuremberg Code. http://www.glphr.org/mission.htm

The Law on Human Tissue implicitly prohibits the cloning of human cells: “Guidelines on Ethics for Medical Research: Reproductive Biology and Genetic Research,” The Medical Research Council of South Africa (1 April 2002) “Gene therapy should be directed to alleviating disease in individual patients, although wider applications may soon call for attention. In the present state of knowledge, any attempt by gene modification to change human traits not associated with disease would not be acceptable. It is recommended that the necessary research should continue. There is, at present, insufficient knowledge to evaluate the risks, to future generations, of gene modification of the germ line. It is therefore recommended that gene modification of the human germ line should not yet be attempted.”

“Therapeutic cloning: It is recommended that, at present, the use and derivation of human stem cells should be limited to two sources: cadaveric fetal tissue and 'surplus' embryos remaining after infertility treatments.”

“Embryos and cadaveric fetal tissue should under no circumstances be bought or sold.”

“Reproductive cloning: It is recommended that in the use of nuclear transfer the reproductive needs of an individual should not over-ride the best interests of the child produced. The risk attached to the use of the technique on humans carries the possibility of hormonal manipulation in the egg donor, multiple miscarriages in the birth mother, and severe developmental abnormalities in any resulting child. The potential harms outweigh the potential benefits, and until studies in animal systems reverse this circumstance, we recommend that the use of human nuclear transfer cloning to create a new life should be prohibited. Critics have raised questions about the appropriate use of scarce resources. This is particularly important in South Africa where public policy has determined that the extension of primary health care to all South Africans must be the nation's first priority in the field of medical care. Is research into, and the practice of cloning, responsible use of limited State resources? The answer must be negative.”

“Definitions … ‘cloning’ means the creation of identical human organisms from living or dead individuals by manipulation of genetic material, including—

- removal of nuclear material from an oocyte or a female gamete, embryo or embryo cells and replacing it with nuclear material from a zygote or somatic cell at any stage from foetal to adult development; or
- embryo splitting or blastomere separation of any of the cells which originate from a fertilised ovum.”

“Prohibition of reproductive cloning of human beings: A person may not

- manipulate any genetic material, including genetic material of human gametes, zygotes or embryos; or
- engage in any activity, including nuclear transfer or embryo splitting, for the purpose of the reproductive cloning of a human being.

“The Minister may, under such conditions as may be prescribed, permit therapeutic cloning utilizing adult or umbilical cord stem cells.

“No person may import or export human zygotes or embryos without the prior written approval of the Minister.

“The Minister may permit research on stem cells and zygotes which are not more than 14 days old on a written application and if

- the applicant undertakes to document the research for record purposes; and

- prior consent is obtained from the donor of such stem cells or zygotes.”

Tunisia: “Opinion No. 3,” “National Medical Ethics Committee (1997). At the request of the Minister of Health, the National Medical Ethics Committee analyzed the issue of human cloning. The Committee concluded that any technology of human cloning should

be banned. It deemed the practice as undermining the field of human reproduction and the dignity of the human species, leaving the door open to all forms of abuse." ("National Legislation Concerning Human Reproductive and Therapeutic Cloning," UNESCO Division of the Ethics of Science and Technology, Paris, April 2004.)

Part IV: The International Situation

6. Australia, New Zealand and Asia

Australia: The federal government passed a law in 2002 legalizing stem-cell research. In June, 2007, the government of New South Wales passed legislation to lift a ban on human cloning allowing researchers to clone and destroy human embryos for stem-cell research. In April 2004, Australia granted licences to two in-vitro fertilization clinics to begin using "excess" embryonic humans for research purposes.

China: China has one of the most permissive embryonic stem cell research policies in the world but its policies of restricting information to the public and to foreign journalists make it difficult to ascertain exactly what research is and is not allowed. In 2003, the Ministry of Science and Technology and Ministry of Health issued official ethical guidelines for human embryonic stem cell research in its territories. The guidelines forbid only human “reproductive” cloning and allow research on embryos obtained from:

- Spare gamete or blastocysts after in vitro fertilization (IVF) procedures;
- Foetal cells from accidental spontaneous or voluntarily selected abortions;
- Blastocyst or parthenogenetic split blastocyst obtained by somatic cell nuclear transfer technology; or
- Germ cells voluntarily donated.

Chinese researchers are moving ahead on a number of fronts, including the creation of cloned human/animal hybrids. On September 7, 2001 a report was published in Beijing Youth Daily: Professor Chen Xigu in the Experimental Animal Center of Sun Yat-sen University, transferred a skin cell nucleus from a 7 year old boy into a rabbit's denucleated egg, and created an embryo. The aim was reported to be to use cloning to develop cures for such illnesses as diabetes and Parkinson's disease.

It has been observed[110] that the Chinese cultural tradition of Confucianism to a certain extent precludes the kind of ethical reservations about the moral status of the embryo that is common in the West. Dr. Yanguang Wang, Ph.D., M.D., a self-described "Chinese bioethicist", wrote that senior bioethicist Professor Renzong Qiu argued that under the Confucian philosophy, backed up by Marxist theory, "a person begins with birth. A person is an entity that has a body or shape and psyche, and has rational, emotional and social-relational capacity. So a human embryo is not a person, a personal life. Destroying an embryo as well as an abortion should not be taken as killing a person."

India: "Ethical Policies on the Human Genome, Genetic Research and Services," Department of Biotechnology, Ministry of Science and Technology, Government of India (June 2001). "Policies: Gene Therapy and Human Cloning. Considering the present state of knowledge, germline therapy in humans shall be proscribed. However, research on embryonic stem cell biology may be undertaken with adequate safety measures. As a principle, human cloning shall not be permitted."

Japan: Embryonic stem cell research and therapeutic cloning are permitted, but "reproductive" cloning is banned. Production of cloned human embryos will be limited to basic research or regenerative medicine only (Bioethics Committee of the Council for Science and Technology Policy).

New Zealand[111]**:** Embryonic stem cell research and therapeutic cloning are permitted, but "reproductive" cloning is banned. In 2004, the Human Assisted Reproductive Technology Bill was amended to ban "reproductive" cloning and genetically engineered babies. In 2006 the New Zealand government budgeted $500,000 per year to fund the eugenic practice of pre-implantation genetic diagnosis (PGD). It was noted that the

[110] Yanguang Wang, Ph.D., M.D. Centre for Bioethics, Institute of Philosophy, Chinese Academy of Social Sciences, 'Chinese Ethical Views on Embryo Stem (ES) Cell Research"
http://www.eubios.info/ABC4/abc4049.htm
[111] "Cloning Bill for New Zealand called 'Better than Nothing'"
http://www.lifesite.net/ldn/2004/nov/04111207.html

2004 New Zealand legislation used the Canadian bill as a template for its prohibitions and restrictions.

Singapore: On 21 June 2002 the Bioethics Advisory Committee of Singapore (BAC) released a report on “Ethical, Legal and Social Issues in Human Stem Cell Research, Reproductive and Therapeutic Cloning.” The BAC recommends a complete ban on reproductive cloning and would permit therapeutic cloning only under strict regulations. Recommendation 7 states: “There should be a complete ban on the implantation of a human embryo created by the application of cloning technology into a womb, or any treatment of a human embryo intended to result in its development into a viable infant.” The report also concluded that creation of human embryos either by IVF (In Vitro Fertilization) or by SCNT (Somatic Cell Nuclear Transfer) for research purposes can only be justified where

- there is strong scientific merit in, and potential medical benefit from, such research;
- no acceptable alternative exists, and
- on a highly selective, case-by-case basis, with specific approval from the proposed statutory body.

On 18 July 2002, the government approved the BAC recommendations.

South Korea:“Life Ethics Law” 29 January 2004. The Life Ethics Law regulates embryonic stem cell research. According to the law only supernumerary embryos produced for infertility treatments can be used for research, therefore the creation of embryos for purposes other than infertility treatment is prohibited. However, the government will approve limited research on somatic cell nuclear transfer based on the guidelines drawn up by the National Ethics Committees. Human “reproductive” cloning is prohibited and subject to criminal sanctions for up to ten years in prison.(“Biological Ethics Bill Passed by National Assembly,” Korean Ministry of Health and Welfare, Press Release (14 January 2004)). “Guidelines on the Safety of Biotechnology Research,” Ministry of Health and Welfare (December 2000). The guidelines prohibit the

manipulation of the human germline, the creation of IVF embryos solely for research purposes and the cloning human beings.

Vietnam: Embryonic stem cell research is not specifically prohibited, but therapeutic and “reproductive” cloning are. Human cloning and surrogacy banned as of May 2003.

Part V: Resources

1. Source documents and Recommended Reading

"Donum Vitae[112]: Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation. Replies to Certain Questions of the Day"
Vatican Congregation for the Doctrine of the Faith, 1987.

> *"The child has the right to be conceived, carried in the womb, brought into the world and brought up within marriage: it is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development."*

The document, Donum Vitae, from the Vatican's Congregation for the Doctrine of the Faith, presents one of the most systematic and comprehensive explanations for the pro-life position against artificial interventions in human reproduction. It was published in 1987, as the IVF industry was becoming prominent in many countries.

Its essential premise of the pro-life movement with regard to artificial procreation is summed up in a single sentence: "The child has the right to be conceived, carried in the womb, brought into the world and brought up within marriage: it is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development."

It clearly lays down the nature of the issues and offers comprehensive arguments for the pro-life position. It makes clear connections with and refers frequently to other, previous Catholic documents on related issues such as those on the nature of marriage and the family, artificial contraception and abortion. This makes it especially useful to

[112] The full text is included in the Appendices and can be found online at: http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_19870222_respect-for-human-life_en.html

Catholics making the case against new reproductive technologies to other Catholics, who frequently are unfamiliar with the Catholic teaching on the subject.

For non-Catholics and for those making the case outside religious circles, the document serves as an invaluable starting point in understanding the problem. Since it was published over twenty years ago, the issues have expanded, but have not changed in their essential substance and even those specific practises of the research industry which were not directly addressed in Donum Vitae can be usefully approached using its principles.

The Nuremberg Code

Internationally recognized directives for medical or other research using living human beings as test subjects that was developed following the revelation of Nazi atrocities on interned citizens and prisoners of war.

The Nuremberg Code clauses are:

- The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision.

  This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonable to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment. The duty and responsibility for ascertaining the

quality of the consent rests upon each individual who initiates, directs or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity.

- The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.

- The experiment should be so designed and based on the results of animal experimentation and a knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment.

- The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.

- No experiment should be conducted where there is an a priori reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.

- The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment.

- Proper preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability, or death.

- The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.

- During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.

- During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject.

"What is Bioethics?"[113]

By Dr. Dianne N. Irving, M.A., Ph.D.

A comprehensive examination by an expert in the field, of the normative system of ethics currently in use in most hospitals in the western world. Dr. Irving has made detailed analyses of legislation governing the new reproductive technologies and related research around the world and has concluded that this utilitarian-based system is at work in all of them. She concludes that Bioethics is a system that is completely incompatible with traditional Natural Law-based medical and research ethics. Her book, "What is Bioethics" is basic reading for anyone wanting to understand the current situation and its origins. The full text is available online from various sources. It is published along with many of Dr. Irving's articles on bioethics and biotechnologies at the website of the American Bioethics Advisory Commission. http://www.all.org/abac/index.htm.

[113] It can be downloaded in its entirety at http://www.hospicepatients.org/prof-dianne-irving-whatisbioethics.html

Excerpt:

"A small error in the beginning leads to a multitude of errors in the end." St. Thomas Aquinas.

I. Introduction

There is a strange phenomenon I have encountered over the last several years which I hope to at least identify with this essay. It is the apparent belief that bioethics is somehow the same as, or to be equated with, ethics per se, or at least with medical ethics per se. I have even heard it referred to as Roman Catholic medical ethics per se. Repeatedly, when I ask a group to define "bioethics," I usually get the same sort of response. I hope with this essay to disenfranchise people of this belief.

Contrary to "popular opinion," bioethics, as predominantly practiced today -- especially as embedded in formal governmental regulations, state laws and a myriad of other documents, committees, guidelines, guidebooks, etc., around the world[1] -- is not the same thing as "ethics per se." Academically it is actually a sub-field of ethics, and stands alongside many other theories of ethics, e.g., Kantian deontology, Millsean utilitarianism, casuistry, natural law, egoism, situation ethics, relativism, and various forms of theological ethics, etc. And like all ethical theories, bioethics is by no means "neutral" -- there is no such thing as a "neutral ethics." In fact, bioethics defines itself as a normative ethical theory -- i.e., it takes a stand on what is right or wrong.

Nor is bioethics to be equated with "medical ethics," as that term is still generally understood. Nor is it the same as Roman Catholic medical ethics, or any other such subsystem of ethics that could be used to determine the rightness and wrongness of human actions within the medical context.

As we will see, bioethics understood as "principlism" is an academic theory of ethics which was formally articulated for the first time in 1978 by the Congressionally-mandated 11-member National Commission in their Belmont Report. That Report, as Congressionally mandated, identified three bioethics principles: respect for persons, justice and beneficence. (As will be demonstrated below, the Commission defined these three bioethics principles in less-than-traditional terms). Nor is bioethics restricted to the medical context. Nor has bioethics ever even considered abortion a serious issue of debate (although the definitions of a "human being" and of a "human person" concretized in the Roe v. Wade decision has reverberated throughout the bioethics literature since then -- especially in the issues concerning human embryo and foetal research). At least this much must be clear before anyone enters these public "bioethics" dialogues.

My purpose in this paper is simply to provide historical confirmation of what bioethics is, who the Founders, theorists and practitioners are, identify just some of the major issues addressed (particularly those concerning research using human embryos and foetuses), and touch on some of the more salient inherent problems of and concerns about this "theory." As the formal body of bioethics literature is enormous -- extending over 30 years or more -- it will be impossible in this essay to properly evaluate in detail all of the ramifications of this "bioethics edifice."

My method will be primarily historical -- in terms of relating, only in the briefest of outline form, the short but extensively referenced and hectic history leading up to the actual articulation of the three bioethics principles of autonomy, justice and beneficence in the National Commission's Belmont Report. Because many of you are probably not familiar with those who have and still play major roles in bioethics, I will list as many of them as is reasonably feasible in the main text.

Pro-life 101 : A Step-by-Step Guide to Making Your Case Persuasively.

By Scott Klusendorf

The book that systematically presents Scott Klusendorf's methods of making the pro-life case, whether regarding abortion or the Early Life Issues, using reason and science.

$7.00 (Booklet, 69 pages)

It and other pro-life apologetics material can be purchased online at http://prolifetraining.com/Pro-Life_Products.htm

The Origins of Nazi Genocide: From Euthanasia to the Final Solution.

Henry Friedlander

Chapel Hill and London: The North Carolina University Press, 1995.

Friedlander's book is one of the most thorough and chilling analyses of the philosophical underpinnings of the eugenics movement that led to the Nazi Holocaust. To understand the larger picture involved in the current revival of eugenics in the field of biotechnology, Origins of Nazi Genocide is invaluable.

Part V: Resources

2. Online Information

The following websites were used in the compiling of this text and are invaluable in understanding the current situation in the Early Life Issues, ethics and biotechnology around the world.

LifeSiteNews

http://www.lifesite.net/

LifeSiteNews.com is noted for the broad range of issues it includes in the "bigger picture" of the life and family issues. It is a non-profit internet service launched in September 1997. LifeSiteNews Daily News reports are available by free online subscription. LifeSiteNews' archives and information pages are widely used by other services and publications and by professionals and political, religious and life and family organization leaders and grassroots people across North America and internationally.

LifeSiteNews' well organised archives cover every topic of interest to the pro-life and pro-family movement that made the news in the last ten years.

LifeSiteNews produces original sub-sections on stem cells, cloning, biotechnologies, fetal development and more. All sub-sections are updated and new ones produced as resources permit and new developments arise.

LifeSiteNews' page of archived articles on the Early Life Issues, covering 2001-2005, can be found at
http://www.lifesite.net/features/stemcellembryo/index.html

American Bioethics Advisory Commission

A division of American Life League.

http://www.all.org/abac/

Information and articles on:

Eugenics, News, Cloning, Euthanasia, Genetics, Personhood.

The site serves as the repository of many of Dianne Irving's articles critiquing Bioethics, cloning, legislative attempts to ban cloning and regulate the NRT as well as problems with language and terminology. The site also includes articles by philosopher Leon Kass, Lutheran theologian Gilbert Meilaender, and embryologist C. Ward Kischer, Ph.D.

The Society for the Protection of Unborn Children

http://www.spuc.org.uk/documents/papers/

The leading pro-life education and political lobby in Europe, based in London. Their "Papers on Bioethics" page includes many articles on the full range of Early Life Issues including:

- Cloning
- Parthenogenesis
- The abortifacient nature of oral contraceptives
- Stem cells
- Sex selection in IVF
- Transgenics
- Preimplantation Genetic Diagnosis

Leon Kass

Leon R. Kass, M.D., Ph.D., is the Addie Clark Harding Professor in the Committee on Social Thought and the College at the University of Chicago and Hertog Fellow in Social Thought at the American Enterprise Institute. He was chairman of the President's Council on Bioethics from 2002 to 2005.

A prominent thinker and writer in bioethics. Kass does not come from an entirely pro-life point of view but his analysis of the issues is thorough and his perspective broad and unique. Kass served as Chairman of the President's Council on Bioethics through some crucial years in terms of scientific developments in cloning and embryo research.

A number of his articles can be found at
The American Bioethics Advisory Commission site and also:
http://www.alteich.com/links/kass.htm

Concerned Women for America

Is a public policy women's organization whose “six core issues,” includes the “Sanctity of Human Life” with an extensive library page available at:
http://www.cwfa.org/library.asp?category=life

CWA’s website includes pro-life position papers on biotechnologies, stem cell research, cloning, and artificial procreation.

Life Issues. Net

http://www.lifeissues.net/

The news and article archive site edited by Fr. Jerry Novotny, O.M.I. The site features articles on a wide variety of life and family related issues by some of the leading thinkers, writers and activists in the US, Canada and Europe including:
Dr. Dianne Irving
Steven Mosher
Doug McManaman
Donald DeMarco
Fr. Thomas J. Euteneuer
Dr. John B. Shea
Nancy Valko
Mark Pickup
Wesley J. Smith

Pro-Life Training Institute

http://www.prolifetraining.com/

The organisation founded by American pro-life apologist and lecturer Scott Klusendorf who has made a life work of training pro-life people, especially the young, persuasively

to make the case for the pro-life position in the public square. He contends that the pro-life message can compete in the marketplace of ideas if properly understood and properly articulated. He uses and trains others to use a powerful combination of graphic images, classical logic and rhetorical technique and accurate biological science.

A passionate and engaging speaker, Klusendorf has appeared on nationally syndicated programs like “Focus on the Family” w/ James Dobson, Billy Graham’s “Hour of Decision,” “The Bible Answer Man” w/ Hank Hanegraaff, “For Faith and Family” w/ Dr. Richard Land, "Faith Under Fire" w/ Lee Strobel," and “American Family Radio” w/ Tim Wildmon. Nationally, he’s participated in numerous debates at the collegiate and university levels. His presentation to the members of the Canadian Parliamentary Pro-life Caucus was instrumental in clarifying the issues surrounding Canada’s stem cell and cloning legislation.

Appendix 1. Glossary of Philosophical Terms

Absolute: Something that is independent of, and unconditioned by, anything external to itself (non-contingent).

Abstract idea: A general idea; that which exists in the mind rather than in the external world.

Absurd: In logic, that which is irrational or contradictory.

Accident: In metaphysics, a quality, property or characteristic that is not essential to the nature of a thing. (See “essence”)

Actuality: In scholastic philosophy, the state of being something in reality (or in fact) rather than being something in potential.

A fortiori: Literally, with greater force; in logic, all the more reason.

Agnosticism: The belief that one does not, or cannot, know ultimate reality (especially God).

Altruism: The belief that everyone should be concerned for the benefit and welfare of others.

Amoral: That which is neither moral nor immoral; outside the moral realm.

Analytic proposition: According to Kant, a proposition (statement) that is true by definition; a proposition whose predicate is deducible from the subject, as in "All bachelors are unmarried men."

Anthropomorphism: The act of ascribing human characteristics to non-humans (especially to God).

Apologetics: Literally, to give a defence; in philosophy, to give rational justification for one's beliefs.

A posteriori: In epistemology, knowledge derived from, or posterior to (comes after), five sense experience. Knowledge that comes from experience.

A priori: In epistemology, knowledge which is acquired prior to, or independently of, five sense experience.

Archetype: An original model, type, pattern, or paradigm.

Atheism: The belief that no God or gods exist in or beyond the universe (traditional usage). Sometimes defined as an absence of belief in God.

Attribute: A quality, property, or characteristic which is attributed to, or predicated of, something.

Autonomy: The state of being independent, self-determining, or free.

Being: That which exists, or is real (unchanging reality).

Cartesian dualism: holds that the mind is a nonphysical substance. René Descartes was the first to clearly identify the mind with consciousness and self-awareness and to distinguish this from the brain, which was the seat of intelligence. Hence, he was the first to formulate the mind-body problem in the form in which it exists today. The theory holds that the mind or the soul is encased or carried by the body, but that the two are distinct. See also: mind-body problem

Categorical imperative: Immanuel Kant's central ethical principle of conduct: "Always act so as to will the maxim of your action to become a universal law." Moral conduct should be universalized. The classic example of a purely deontological approach to ethics.

Causality: Every effect must have a sufficient cause; everything that comes into being must have a cause.

Coherence theory of truth: Truth is determined by that which is internally and logically consistent.

Contingent: The state of being dependent upon something else for existence.

Correspondence theory of truth: Truth is determined by that which corresponds to the present state of affairs.

Cosmological argument: A proof for the existence of God; derived from the Greek word kosmos (world), the argument states that a contingent world requires the existence of God as its ultimate cause. The argument appears in different forms (unmoved mover, first cause, contingency, kalam), and has been presented and defended by numerous philosophers including: Aristotle, Thomas Aquinas, Gottfried Leibniz, and Medieval Islamic philosopher Al-Ghazali.

Cosmos: From the Greek word kosmos, meaning world or universe.

Deductive reasoning: Reasoning in which the conclusion of an argument follows with logical necessity (certainty) from the premises. Deductive Reasoning usually proceeds from general to particular, or from whole to parts. Contrasted with Inductive Reasoning.

Deism: Belief in a God who created the world, but does not intervene within it (God is transcendent, but not immanent). This religious world view, which emphasizes reason

over revelation, was most popular during the 17th and 18th centuries in England, France and America.

Determinism: The view that everything in the universe is controlled by previous conditions, and therefore could not be otherwise.

Dialectic: The process of drawing out logical truths through dialogue, reasoning and argumentation.

Dualism: In metaphysics, the view that reality consists of two fundamentally distinct entities, the physical and “spiritual”.

Efficient cause: The agent through which something is produced or comes into being.

Empiricism: The belief that the source of all knowledge is five sense experience. All knowledge of actually existing things is acquired through five sense experience. Contrasted with Rationalism.

Epicurieanism: A hedonistic philosophy, founded by Epicurus, which stressed long-term and higher pleasure (i.e., pleasures of the mind over the bodily appetites).

Epistemology: The branch or field of philosophy concerned with the origin, nature, and limits of knowledge.

Essence: The nature or "whatness" of a thing. The qualities or attributes hat make a thing what it is. (See “accident”)

Ethics: The branch or field of philosophy concerned with moral values and human conduct.

Existentialism: A modern approach (movement) to philosophy which rejects abstractions, and stresses concrete reality, especially individual human freedom, choice, subjectivity, and existence.

Fideism: The view that there is no way (and often no need) to justify one's beliefs (usually religious belief). It is usually asserted that faith alone is sufficient.

Final cause: The purpose for the sake of which an agent [person] acts (i.e., the end or goal). One of Aristotle's four causes.

Finite: Having specific boundaries, limitations, or an end. Limitations in attributes and character. Considered the opposite of infinite.

Form: In metaphysics, the essence or nature of an entity.

Formal cause: The structure, form, pattern, or configuration of which something consists. One of Aristotle's four causes.

Foundationalism: In epistemology, the belief that all knowledge is based upon first principles (foundational truths) which provide justification for all other beliefs. Some would argue that these foundational truths are themselves not subject to any proof.

Hedonism: The ethical viewpoint which asserts that pleasure is the summum bonum (greatest good). It is often asserted that mankind is a pleasure-seeking, pain-avoiding animal. There have been several different types of hedonistic philosophies (e.g., Epicureanism, Egoism, Utilitarianism, etc.).

Humanism: The view that "mankind is the measure of all things." Something's value or significance is measured by its relationship to mankind.

Idealism: The metaphysical view that all reality consists of mind and/or ideas. Contrasted with Materialism.

Inherent rights: Rights that are not contingent upon the condition of the subject. Those rights that pertain to the nature of the subject. e.g., A person differs from a thing in that he has rights as part of his nature.

Immanent: The state of being present with something (e.g., God is immanent [present within the universe]).

Independent: In Metaphysics, existence that is not conditioned or controlled by something external to itself; a non-contingent.

Indeterminism: The view that at least some events, especially the human will and behaviour, are free of causal determination.

Indubitable: Beyond all doubt; absolutely or unquestionably true.

Inductive reasoning: Reasoning in which the conclusion of an argument follows only probably from the premises. Inductive Reasoning usually proceeds from particular to general, or from parts to whole. Contrasted with Deductive Reasoning.

Infinite: Without boundaries, limitations, or an end. No limitations in attributes or character. Considered the opposite of finite.

Innate ideas: The belief that at least some ideas are inborn (i.e., present in the mind at birth).

Logic: The study of the principles of correct thinking. The science that evaluates thinking and argumentation. Considered a major branch or field of philosophy.

Material cause: The matter, stuff, or substance of which something is made. One of Aristotle's four causes.

Materialism: The metaphysical view that all reality consists of material or physical entities with their physical properties. Contrasted with Idealism.

Metaphysics: The branch or field of philosophy concerned with the ultimate nature, structure, and characteristics of reality. A narrow usage of the term refers to the study of that which lies beyond the physical realm (i.e., the supernatural realm). Metaphysics is sometimes used interchangeably with the term Ontology.

Mind-body problem or “dichotomy”, is the view that "mental" phenomena are, "non-physical" (distinct from the body). The mind-body dichotomy is the starting point of Dualism, and became conceptualized in the form is currently known in the Western world in René Descartes’ philosophy. This view of reality leads to consider the corporeal as little valued and trivial.

Moral argument: A proof for the existence of God; God's existence is the only adequate grounds to explain objective morality.

Naturalism: The belief that physical nature is the only reality. The philosophy of naturalism is characterized by Monism, antisupernaturalism, scientism, and Humanism.

Nihilism: The view that there is no meaning, purpose, significance, or value in the universe.

Objective idealism: The belief that things (ideas) genuinely exist apart from our perception of them.

Objectivity: external to the mind, real; dealing with outward things and not with thoughts or feelings, exhibiting actual facts uncoloured by exhibitor's feelings or opinions.

Ockham's Razor: The explanation which fits the facts with the least assumptions is the best. Also known as the principle of parsimony.

Ontological argument: A proof for the existence of God; St. Anselm argued that reflection on God's perfect essence (or being) actually necessitates His existence.

Ontology: The study of being; often used interchangeably with Metaphysics.

Pantheism: A world view that makes God identical with the world; "All is God and God is all." God is wholly Immanent, and therefore not transcendent. Pantheism is a popular trend in the environmentalist movement.

Phenomena: In Kant, the world of appearance (how things appear to the senses); as opposed to the Noumena (world of reality). Also referred to as the phenomenal world.

Philosophy: Literally, the "love of wisdom"; an attempt to provide rational and coherent understanding of the fundamental questions of life.

Pluralism: The metaphysical view that ultimate reality consists of many things. Contrasted with Monism.

Pragmatism: An American philosophy which makes workability and practical consequences the test for truth.

Principlism: formal “Bioethics” or Principlism, is a normative system of ethics based on the three “principles”, usually identified as “Justice”, “Beneficence” and “Autonomy.”[114] It was established in 1979 as the “official” ethical system for purposes of federal legislation. Where traditional medical ethics focuses on the physician's duty to the individual patient, these Principles are interpreted in fundamentally utilitarian way, centered, like other utilitarian disciplines, around maximizing total happiness for the whole human race. Specifically, Principlism is the result of an act of the US Congress[115] requiring the appointment of a commission to “identify the basic ethical principles” by which ethical decisions in medical care, particularly surrounding end-of-life issues, could be decided. These were to be translated into practice as the basis of federal regulations concerning the use of human subjects in research. Principlism was derived from the works of secular moral philosophers of the 18th, 19th and 20th centuries, chiefly Kant, John Stuart Mill, and John Rawls, a highly influential radical egalitarian Harvard University philosopher popular on the left in the early 1970’s. Principlism is now the leading form of ethics in the medical and biotechnology research establishments around the world. It forms the basis for most of the claims that embryonic stem cell research and cloning are “ethical”. The terms “bioethics” and “Principlism” are often taken to be synonymous[116].

Rationalism: Broadly speaking, the epistemological view that stresses reason as the test of truth. In a strict sense, the belief that at least some knowledge is acquired independent of sense experience. Contrasted with Empiricism.

Realism: The metaphysical view that asserts that physical objects exist apart from being perceived; the belief that the essences of things possess objective reality.

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[114] The founding document of Principlism is the Belmont Report, published in April 1979, the result of a federal Commission charged with establishing a “neutral” system of ethics for biomedical research, that is, one that ws not based on traditional medical ethics which were seen as too “Judeo-Christian” in origin to be unbiased. http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm

[115] National Research Act, 1974

[116] For more on the meaning and provenance of Bioethics as a formal philosophical system, see Dr. Dianne Irving’s book, “What is Bioethics?” for which a website reference is included in Part V section 1. “Source documents and Recommended Reading”.

Relativism: The belief that no absolutes exist (in truth and/or ethics). Truth and morality vary from person to person, time to time, circumstance to circumstance.

Skepticism: In a loose sense, to doubt, question, or suspend judgment on philosophical issues. In a strict sense, to deny that true knowledge is attainable.

Socratic method: Derived from the Greek philosopher Socrates, a method for finding truth and meaning through rigorous questioning.

Solipsism: "I myself only exist." The only reality that exists is one's self. This is the basis of postmodernism.

Subjectivism: The belief that things (ideas) are dependent upon perception for their particular existence.

Subjectivity: belonging to, of, due to the consciousness of thinking or perceiving subject or ego. As opposed to real or external things; giving prominence to or depending on personal idiosyncrasy or individual point of view.

Substance: A thing's underlying essence; that which makes a thing what it is. (See “accident” and “essence”.)

Syllogism: An argument consisting of three categorical propositions, two serving as premises and one serving as a conclusion. “All cats are mammals; my pet is a cat; therefore, my pet is a mammal,” is an example of a valid syllogism. In pro-life apologetics, the entire rational case is summed up in the syllogism, “It is wrong to kill an innocent human being; the unborn are innocent human beings; therefore abortion, which kills the unborn, is wrong.”

Tabula rasa: Literally, a "blank tablet". John Locke's empirical view that human beings possess no innate (inborn) ideas or principles.

Teleological argument: A proof for the existence of God; design, beauty, harmony, and purposiveness in the universe require a cosmic architect (i.e., God). Known as the design argument, it was defended by Plato, but its most popular presentation was given by William Paley.

Theism: The world view that affirms the existence of an infinite, personal God, who is the transcendent creator, and immanent sustainer of the world. Judaism, Christianity and Islam are examples of theistic religions.

Thomism: Of or pertaining to the philosophical and theological though of St. Thomas Aquinas (1225-1274).

Transcendent: Beyond, or distinct from, the time/space world.

Weltanschauung: German term, referring to a person's world view (a conceptual scheme for interpreting reality).

Appendix 2. Glossary of Biotechnology Terms

Adult (or somatic) stem cell: A non-scientific term for any undifferentiated multipotent or pluripotent cell not derived from an embryo but found in the human body after the embryonic or foetal stage of development. An adult stem cell can renew itself and differentiate to give rise to all the specialized cell types of the tissue from which it originated. Recent research has found that some adult stem cells have nearly pluripotent properties.

Artificial insemination: The injecting of a sample of specially treated sperm from the male partner, or a third party donor, into the female partner's reproductive tract.

Bioethics: broadly, the branch of philosophy that considers what is and is not ethically acceptable in medical practice and research. More specifically, the normative system of ethics based on utilitarian principles, developed at the behest of a committee of the United States Congress, governing the use of human beings in medical research, end-of-life decisions taken by physicians and now, the use of human embryos and cloning. (See “Principlism” in the Glossary of Philosophical Terms).

Blastocoel: The fluid-filled cavity inside the blastocyst.

Blastocyst: A preimplantation embryo of about 150 cells produced by cell division following fertilization. The blastocyst is a sphere made up of an outer layer of cells (the trophoblast), a fluid-filled cavity (the blastocoel), and a cluster of cells on the interior (the inner cell mass).

Blastomere: a type of cell produced by division of the embryo in the early stages of life. Blastomeres of the inner cell mass of a blastocyst are the “embryonic stem cells” sought by some scientists for their pluripotent characteristics. If the embryo is left undisturbed, these inner blastomeres will divide and differentiate to form all the tissues of the child’s body.

Bone marrow stromal (stem) cell: Also known as mesenchymal stem cells. Cells derived from the non-blood forming fraction of bone marrow. Bone marrow stromal cells are capable of growth and differentiation into a number of different cell types including bone, cartilage and fat.

Blastomere separation: A method of cloning that involves the removal from an early term embryo of one or more totipotent blastomeres

Cadaveric foetal tissue: obtained through medical research supply companies from abortion hospitals or private, stand-alone abortion facilities. Foetal tissue implant or fetal cell therapy is implanting tissue or cells from a foetus into a patient for treatment of disease.

Cell division: Method by which a single cell divides to create two cells. There are two main types of cell division: mitosis and meiosis.

Cell culture: Growth of cells in vitro in an artificial medium for experimental research.

Cell line: Cells that can be maintained and grown in culture and display an immortal or indefinite life span.

Chimera: (Lat. *Chimaera*) a monstrous creature of mythology of Asia Minor, which was made of the parts of multiple animals. In biology, a combination of two or more fused embryos (derived from two separate zygotes of the same species, also called “fraternal,”) single individual. It is also possible that two spermatozoa and that fusion then results in a single embryo. See also “Mosaic”.

Cloning: Any asexual means of producing or altering the genetic makeup of a cell or organism. Cloning may occur by propagation of cuttings, as in the case of plants; continual budding, as in the case of hydra; fission, as in the case of bacteria and

protozoa; parthenogenic asexual reproduction as in the case of aphids. Somatic cell nuclear transfer is one technique among many to create clones in higher animals. Others, some occurring naturally, include twinning by separation of blastomeres, mitochondrial transfer and pronuclear transfer.

Cryopreservation: is a process where cells or whole tissues are preserved by cooling to low sub-zero temperatures. Typically the procedure involves the use of liquid nitrogen. At such low temperatures, any biological activity is effectively stopped.

Differentiation: The process by which a cell acquires the characteristics and specialized function of a particular tissue type.

Diploid cell: Diploid cells have two homologous copies of each chromosome, usually one from the mother and one from the father. In human embryos the number is normally 46. Nearly all mammals are diploid organisms.

Directed differentiation: Manipulating stem cell culture conditions to induce differentiation into a particular cell type.

DNA: Deoxyribonucleic acid, a chemical found primarily in the nucleus of cells. DNA carries the instructions or blueprint for making all the structures and materials the body needs to function.

Ectoderm: Outermost germ layer of cells derived from the inner cell mass of the blastocyst; gives rise to the nervous system, sensory organs, skin, and related structures.

Embryo: The child is called an embryo from the moment of fertilization until the end of the 8th week of gestational age, whereafter it is instead called a foetus.

Embryoid bodies: Rounded collections of cells that arise when embryonic stem cells are cultured in suspension. Embryoid bodies contain cell types derived from all 3 germ layers.

Embryonic germ cells: Pluripotent stem cells that are derived from early germ cells (those that would become sperm and eggs). Embryonic germ cells (EG cells) are thought to have properties similar to embryonic stem cells.

Embryonic stem cells: a non-scientific term referring to the cells taken from the inner cell mass of an early-term embryo or blastocyst. These are the “pluripotent” and “totipotent” cells sought by researchers for their potential to form every tissue in the human body.

Embryonic stem cell line: Embryonic stem cells that have been cultured under in vitro conditions that proliferate without differentiation for months to years.

Endoderm: Innermost layer of the cells derived from the inner cell mass of the blastocyst; it gives rise to lungs, other respiratory structures, and digestive organs, or generally "the gut".

Eugenics: a social philosophy which advocates the improvement of human hereditary traits through various forms of intervention. The goals of various groups advocating eugenics have been to create healthier, more intelligent people, to save society's resources, and lessen human suffering. Modern proposed means of achieving these goals always involve aborting unfit children and sterilization of fertile women and men. With the development of NRT’s the tools used include prenatal testing and screening, genetic counseling, birth control, in vitro fertilization, and genetic engineering. Eugenics derives from utilitarian philosophies and formed the foundation of the Nazis’ “racial hygiene” programs in which millions of disabled, elderly, poor, or racially “undesirable” persons were killed.

Fertilization: The joining of the male and female gametes.

“Fertilized egg”: a misnomer commonly found in the media reports on embryo research. The term is generally used as a euphemism to avoid the controversy over embryonic stem cell research and cloning. Most mammals do not have “eggs” but the term is used to avoid using the more politically charged word “embryo”.

Foetal reduction: or “selective reduction”. The aborting of one or more children in cases of multiple pregnancy. Multiple pregnancy frequently follows the use of fertility enhancing drugs.

Foetus: from Latin, literally, “offspring”. It refers to a stage of the child’s development in the uterus after about eight weeks up to birth; before eight weeks, the child is usually referred to as an embryo.

Gametes: mature male (sperm) or female (ova) sex cells.

Gene: A functional unit of heredity that is a segment of DNA found on chromosomes in the nucleus of a cell. Genes direct the formation of an enzyme or other protein.

Germ line cells: those cells formed at a very early embryonic stage that form the gametes, or sex cells of the individual. These diploid cells begin to form in the early embryo as early as 2 – 2 ½ weeks post-fertilization or after cloning; after years of maturing, they form the haploid sex gametes (sperm and oocytes germline cells are not somatic cells). Genetic changes to these cells are passed down to the next generation when the individual reproduces. One of the many techniques of cloning being pursued by researchers is Germ Line Cell Nuclear Transfer as distinct from Somatic Cell Nuclear Transfer.

Germ layers: The three layers of an embryo that will later form the different parts of the body. The three layers are the ectoderm, the mesoderm, and the endoderm.

Germ Line Gene Transfer: The injection of “foreign” DNA or genes into cells or embryos – “gene transfer” – can be used for “enhancement” or for “corrective” purposes. This is a form of eugenics, the effort to “improve” the human race by eliminating unwanted characteristics. In the case of DNA Recombinant Germ Line Gene Transfer, it is the direct manipulation of the genetic make-up of successive generations of human beings.

Haploid cell: a cell containing only half the normal number of chromosomes of an individual of a given species, as in mature gametes. In the case of humans, each sex cell at the point when it is ready to fuse normally has 23 chromosomes.

Heterologous IVF: the technique used to obtain a human conception through the meeting in vitro of gametes taken from at least one donor other than the two spouses.

Homologous IVF: the technique used to obtain a human conception through the meeting of gametes of both the spouses.

Human cloning: (a) organism: the duplication, or near-duplication, of a whole human being using any cloning technique; or, the use of part(s) of human cellular or artificial materials for the purpose of duplicating a whole human being using any technique; (b) molecules: permanently altering the human genome in successive reproductive generations by means of the duplication, or near duplication, of human genetic materials using any a-sexual reproductive technique and/or any sexual reproductive technique.

Human genome: The total nuclear and cytoplasmic DNA genetic materials that constitute an organism as an individual member of the human species.

Inner cell mass: The cluster of cells inside the blastocyst. These cells give rise to the embryo and ultimately the fetus. The inner cell mass cells are used to generate embryonic stem cells. See also “blastomere.”

Intracytoplasmic sperm injection: Injection of a single sperm into a selected ovum. It is most commonly used to overcome male infertility problems. It is one of the artificial procreation techniques most frequently cited in studies on the incidence of birth defects in the new reproductive technologies.

In vitro: Latin for "in glass"; in a laboratory dish or test tube; an artificial environment.

In vitro fertilization: A procedure where an oocyte and sperm cells are brought together in a dish (i.e. in vitro). The resulting zygote, will start dividing and after a several divisions, can be implanted into the womb of a woman.

Meiosis: Cell division of a gamete to reduce the chromosomes within it to half the normal number. This is to ensure that fertilization restores the full number of chromosomes rather than causing aneuploidy, or an abnormal number of chromosomes.

Mesenchymal stem cells: See “bone marrow stromal (stem) cell”.

Mesoderm: Middle germ layer cells of an embryo. It gives rise to bone, muscle, connective tissue, kidneys, and related structures.

Mitochondria: a membrane-enclosed organelle, found in most eukaryotic cells. Mitochondria are sometimes described as "cellular power plants," because they generate most of the cell's supply of ATP, used as a source of chemical energy. Mitochondrial DNA remains in the ennucleated oocyte and in the embryo resulting from the SCNT process.

Mitochondrial transfer cloning: an a-sexual form of manipulation of an embryo (cloning) in which the mitochondria (containing mitochondrial DNA) from a human donor female oocyte are transferred to another human female oocyte, or to a newly produced human embryo.

Mitosis: The division of the nucleus of any cell with a full complement of chromosomes, separating the duplicated genome into two sets identical to the parent's. Stem cells replicate by mitosis.

Mosaic: or mosaicism, in one individual, denotes the presence of two populations of cells with different genotypes, developed from a single embryo. Mosaicism may result from a mutation during development which is propagated to only a subset of the adult cells. Although the two can have some common symptoms, mosaicism is distinct from chimerism. In the latter, the two or more genotypes arise from more than one zygote, while in mosaics, these genotypes arise from only a single cell.

Multipotent: Stem cells that can form many differentiated cell types, but all within a particular tissue, organ, or physiological system. Blood-forming (hematopoietic) stem cells are single multipotent cells that can produce all cell types that are normal components of the blood.

Neural stem cell: A stem cell found in adult neural tissue that can give rise to neurons and glial (supporting) cells.

NRT: New Reproductive Technologies. any artificial intervention employed to obtain a living human being at any stage of development for “reproductive” purposes. That is, any method of making a human being in the embryonic stage of life by any means other than sexual intercourse.

Cloning is included in these because a human being is created and is fully in existence from the first moment of the proper ordering of the genetic material that makes up the

human being at the earliest stage of life whether that ordering has been brought about by the combination of oocytes and sperm or by any other non-sexual method.

Organ farming: (Theoretical). Scientists have proposed that one use of therapeutic cloning, that is, the creation of a live cloned human being to be used as a source of stem cells or research material, could be the creation of human bodies, kept alive through artificial means, that could yield genetically matched replacement organs for patients. In theory, these bodies could be created by cloning from the genetic material of the patient and thereby avoid the problem of immune system tissue rejection common to conventional organ replacement.

Parthenogenesis: A form of reproduction where an embryo develops without the fusion of sperm with the oocyte. Parthenogenesis occurs naturally in some species, including lower plants, invertebrates (e.g. water fleas, aphids, some bees and parasitic wasps), and vertebrates (e.g. some reptiles, fish, and, very rarely, birds and sharks). Some scientists have proposed artificially inducing parthenogenesis with human oocytes as a means to obtain stem cells without fertilization. It is sometimes also used to describe reproduction modes in hermaphroditic species which can self-fertilize.

Peripheral blood stem cell transplantation: a method of replacing blood-forming cells destroyed by cancer treatment. Stem cells found in the circulating blood, similar to those in the bone marrow, are given to the patient after treatment. Transplantation may be autologous (an individual's own blood cells saved earlier), allogeneic (blood cells donated by someone else), or syngeneic (blood cells donated by an identical twin). Also called peripheral stem cell support.

Preimplantation genetic diagnosis: A eugenic practice commonly offered by IVF facilities. It involves the removal of one or more blastomeres from an early term embryo and examination for genetic abnormalities. The undesired embryos are usually either discarded or donated for research. It is commonly used to “screen” for possible indications of Down’s syndrome.

Prenatal diagnosis: Using ultrasound or the more invasive and dangerous amniocentesis and choriocentesis, it is the diagnosis of a disease or condition in a foetus or embryo before it is born. The aim is to detect birth defects such as neural tube defects, chromosome abnormalities, genetic diseases and other conditions. It can also be used to determine the sex of the unborn baby. A child seen to have a disorder is sometimes treated *in utero* but very frequently aborted.

Diagnostic prenatal testing can be by invasive methods or non-invasive methods. An invasive method is when probes or needles are inserted into the placenta, e.g. amniocentesis, which can be done from about 14 weeks gestation, and sometimes results in a miscarriage. Chorionic villus sampling can be done earlier (between 9.5 and 12.5 weeks gestation) but is slightly more risky to the unborn child. Non-invasive methods such as ultrasound and maternal serum screens
can evaluate risk of a condition but not determine 100% if the child has a condition.

Principlism: an academic theory of ethics which was formally articulated for the first time in 1978 by the Congressionally-mandated National Commission in their Belmont Report. That report identified three bioethics principles: “respect for persons” (autonomy), justice and beneficence. These have consistently been given strict utilitarian interpretations since their implementation in most medical and research institutions.

Plasticity: The ability of stem cells to generate the various differentiated cell types.

Pluripotent: Ability of a single stem cell to give rise to all of the various cell types that make up the body. Pluripotent cells cannot make so-called "extra-embryonic" tissues such as the amnion, chorion, and other components of the placenta.

Polar Body: a molecule ejected by the oocyte at the time of fertilization containing 23 female chromosomes. Polar bodies can be recovered and the genes used in some cloning processes.

Progenitor cell: often confused with stem cells, progenitor cells differ in that they can only differentiate. They cannot renew itself indefinitely through cell division. Progenitor cells are usually limited in the kinds of cells it can become than a stem cell. Pogenitor cells are found in the various tissues of the body. Their main role is to replace cells lost by normal attrition.

Pronuclear transfer cloning: a form of a-sexual reproduction (cloning) in which male and/or female pronuclei are transferred from one or more embryos to an enucleated oocyte to create an embryo.

Pronucleus: The haploid nucleus of a sperm or oocyte after fertilization but before fusion of the nuclei.

“Reproductive cloning”: Creating a cloned organism for the purpose of reproduction, either in animals or humans. The term is commonly used in the media and by researchers to create a false distinction between “therapeutic” and “reproductive” cloning to gain public and political support. Public opinion is largely against the creation of cloned human children but when the term “therapeutic cloning” is used, the reaction is largely favourable, even though the process is precisely the same except that the cloned person is killed and used to obtain stem cells.

Sex selection: the selection of embryos created in the lab for a particular sex. The practice is outlawed in some countries but is still widely practiced and usually involves the elimination of girls.

Somatic cell nuclear transfer (SCNT): A method of cloning in which the nucleus of a female gamete is removed and replaced with the nucleus of a somatic (body) cell of

another organism. to make an embryo. SCNT is often taken as synonymous with cloning, but in reality it is only one method of creating a clone among many.

Somatic stem cells: See “adult stem cells”.

Stem cell: a general term, (now falling into disuse in scientific literature) that refers to any undifferentiated cell having the ability both to self-replicate by cell division and differentiate into one or more types of tissue in the body.

Surrogacy: an arrangement whereby a woman agrees to become pregnant for the purpose of gestating and giving birth to a child for others to raise. She may be the child's genetic mother (the more traditional form of surrogacy), or she may be implanted with someone else's IVF embryo (gestational surrogacy).

“Therapeutic cloning”: The use of any method of cloning to obtain a living embryo in order to use that embryo’s cells for research or therapeutic application. Often used in media and by researchers to create a false distinction between two “types” of cloning “reproductive” and “therapeutic.” In reality the two terms refer only to the intended use of the cloned embryo. See “reproductive cloning”.

Totipotent: (From Latin) literally “having all powers”. Stem cells that can give rise to all cell types that are found in an embryo, foetus, or developed organism, including the embryonic components of the trophoblast and placenta required to support development and birth. The zygote and the cells at the very early stages following fertilization (i.e., the 2-cell stage) are considered totipotent.

Trophoblast: The extraembryonic tissue responsible for implantation, developing into the placenta, and controlling the exchange of oxygen and metabolites between mother and embryo.

Twinning: in NRT procedures, means the creation of identical twins by the separation of one or more totipotent blastomeres from the early term embryo.

Umbilical cord stem cells: Blood-derived (Hematopoietic) stem cells present in the blood of the umbilical cord during and shortly after delivery. Umbilical cord stem cells are similar to stem cells that reside in bone marrow, and have been found to have embryo-like qualities in recent research. Efforts are now being undertaken to collect these cells and store them in freezers for later use.

Undifferentiated: A cell that has not yet generated structures or manufactured proteins characteristic of a specialized cell type.

Zygote: An embryo at the earliest single-cell stage after fertilization. Two haploid sex cells, an ovum from a female and a sperm cell from a male, merge into a single diploid cell called the zygote.