

Ethical Issues Associated With IVF and Related Technologies

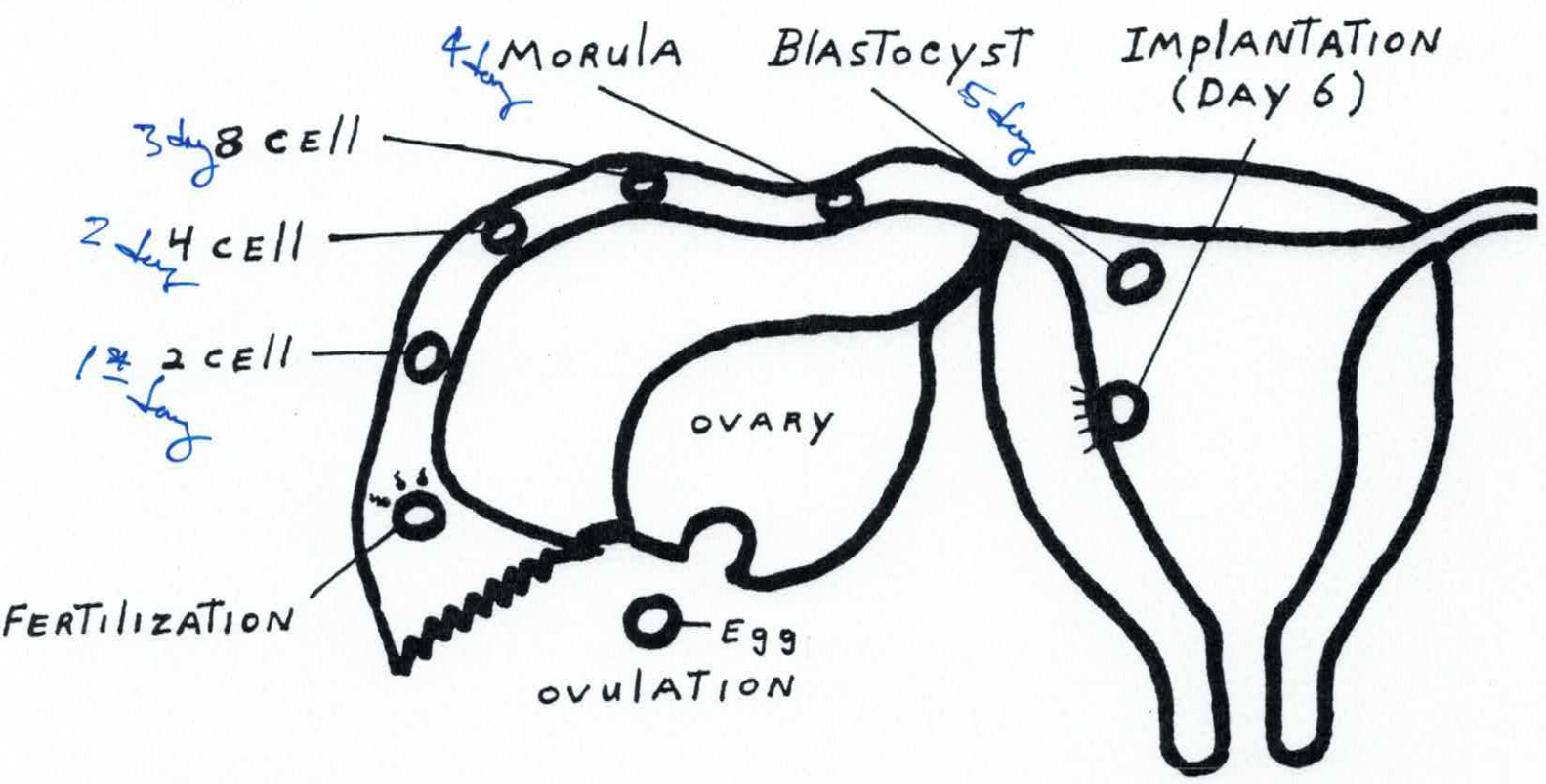
By

Robert D. Visscher, MD

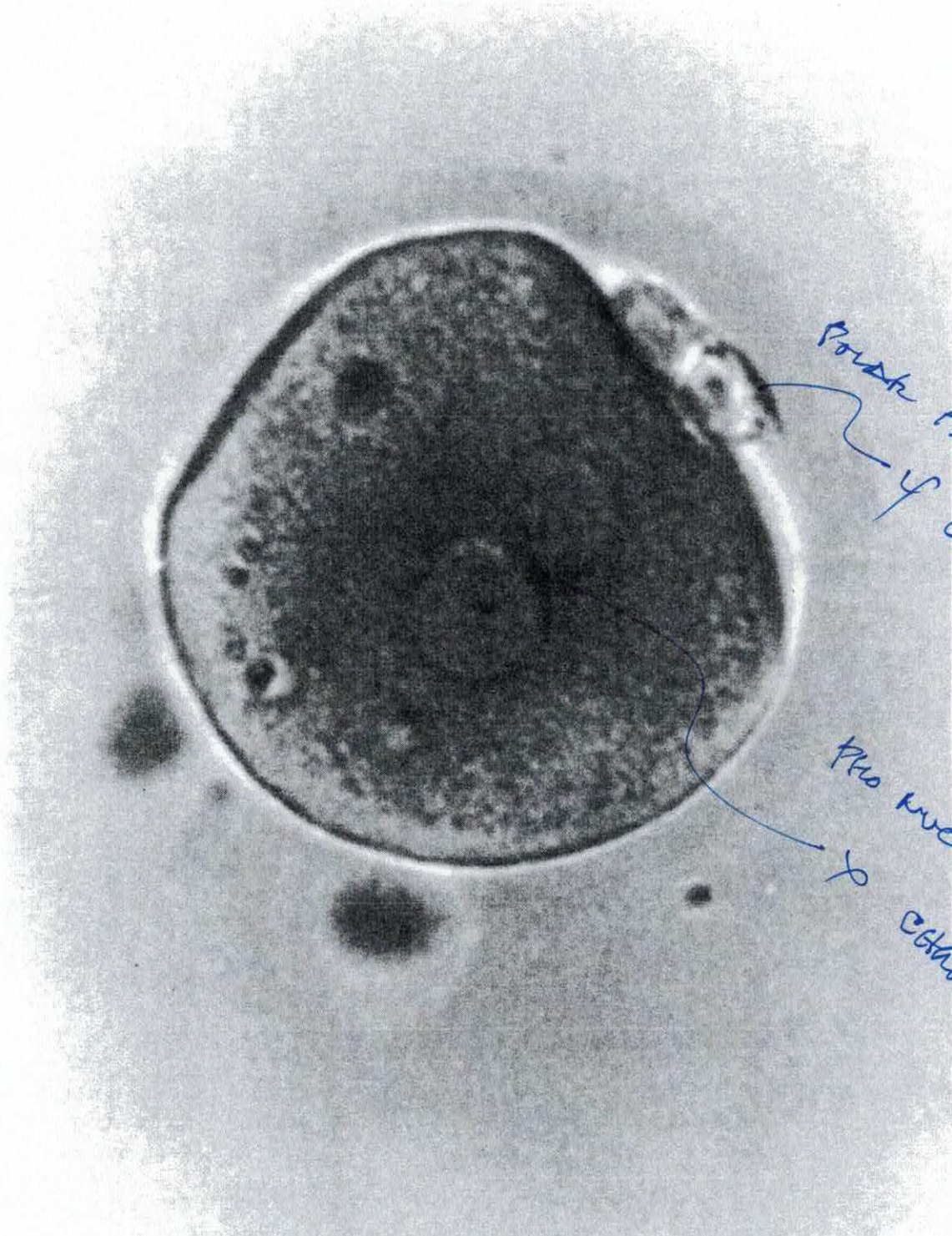
IVF – In Vitro Fertilization is the technique used to create human embryos in the medical laboratory.

IVF is the gateway to biomedical science & technology

- ART -- Assisted Reproductive Technologies
- PGD – Preimplantation Genetic Diagnosis– Reproductive Genetics - genetic testing and embryo selection
- ESC – Embryonic Stem Cell Research
- Therapeutic Cloning - Embryo Research
- Germ-Line Engineering - Embryo Research
- Origin of Birth Defects
- Contraceptive Research and Development
- Cancer Research – Cell Biology - early cell division

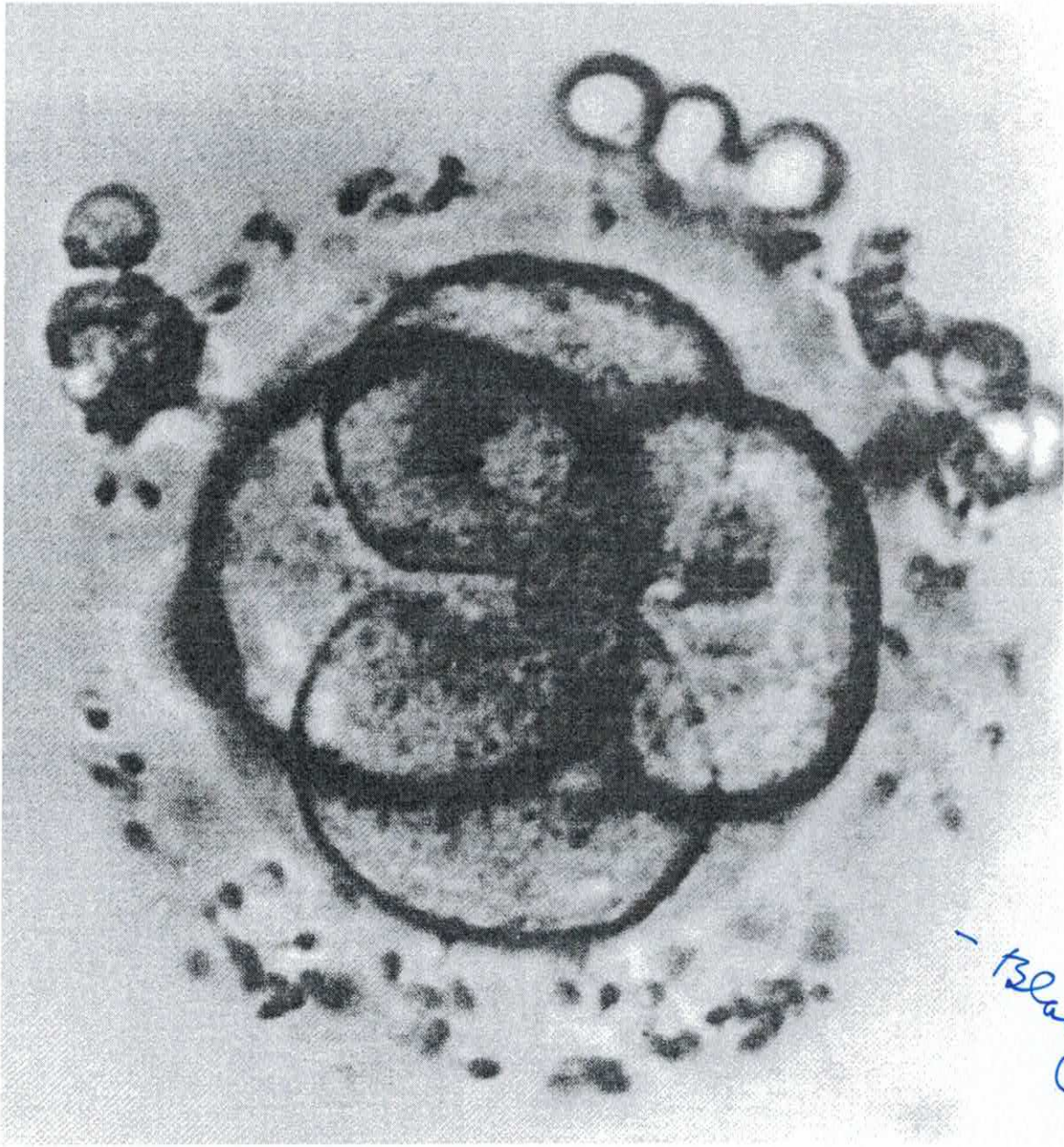


12-18 hrs
to show fertilization



Rough proty
y
cellular zones

Kno kuelle!
y
cellular zones

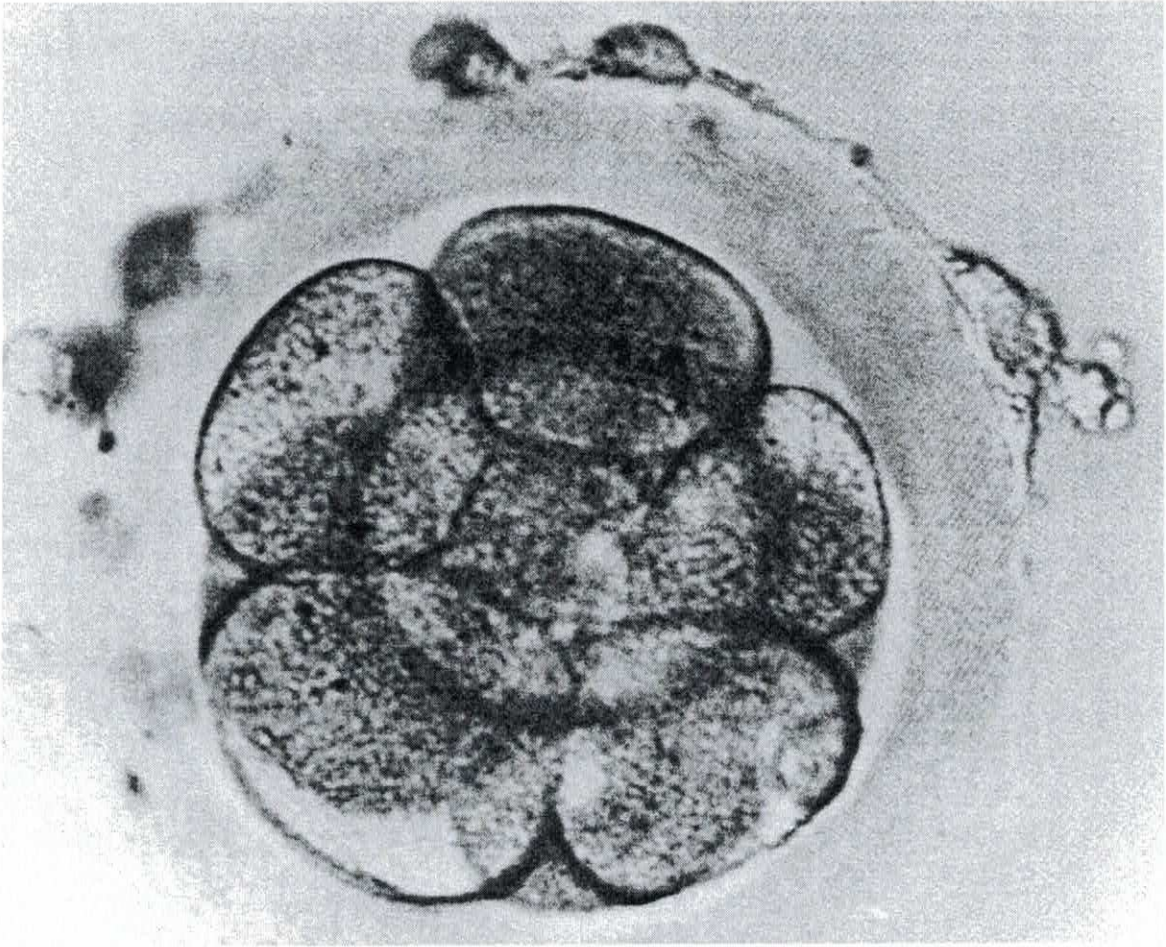


- Blastomere
Cells

22-24 hrs.
1st cell division
8 cells - Day 3

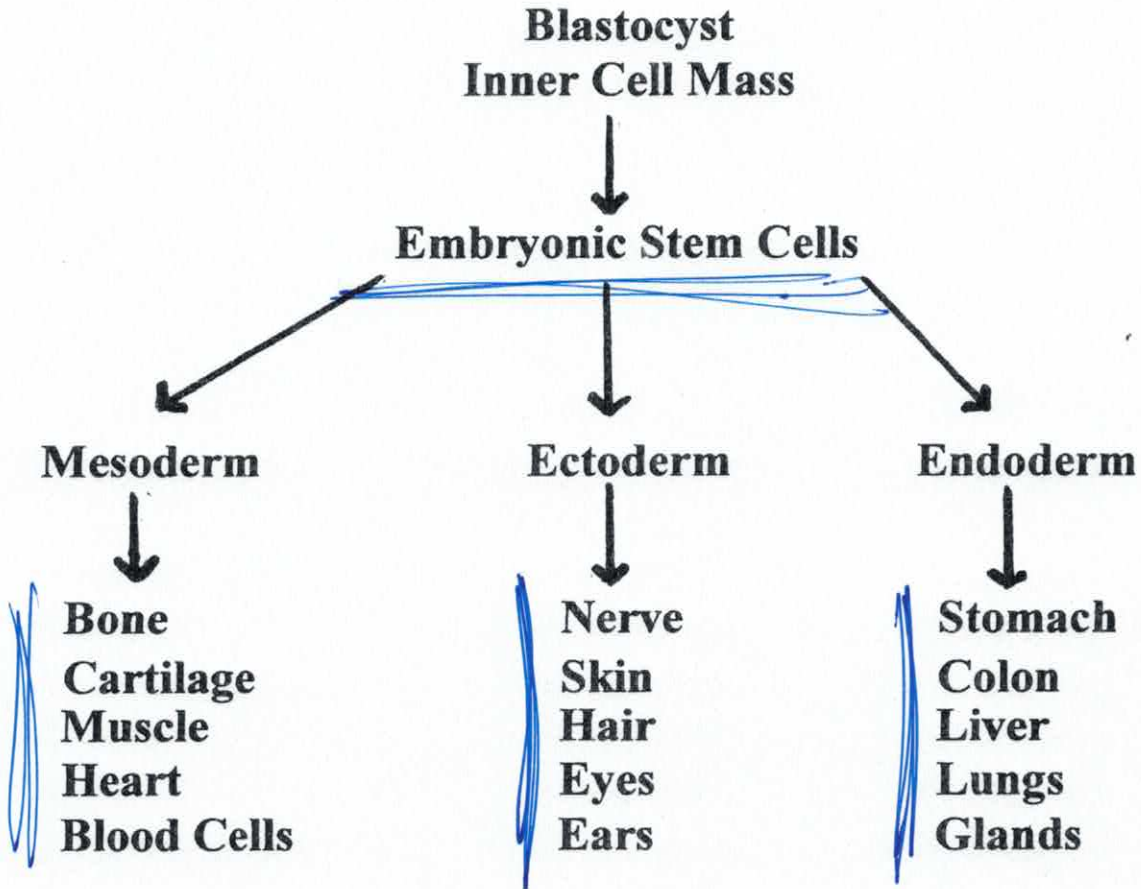
STATE OF A.R.T. in 2002

- U.S. Clinics reporting (92%) 391/428
- ART Cycles 115,392
 - ‡ Standard IVF Cycles - 74%
-with or without ICSI
 - ‡ Frozen Embryo Cycles - 14%
 - ‡ Egg Donation Cycles - 11%
- Live Birth Deliveries 33,141
 - ‡ Standard IVF Cycle – 34%
 - varies with woman's age – 40 to 10%
 - twins – 35%; triplets plus – 5%
 - ‡ Frozen Embryo Transfer – 32%
 - ‡ Donor Egg Transfer – 42%
- Babies Born 45,751

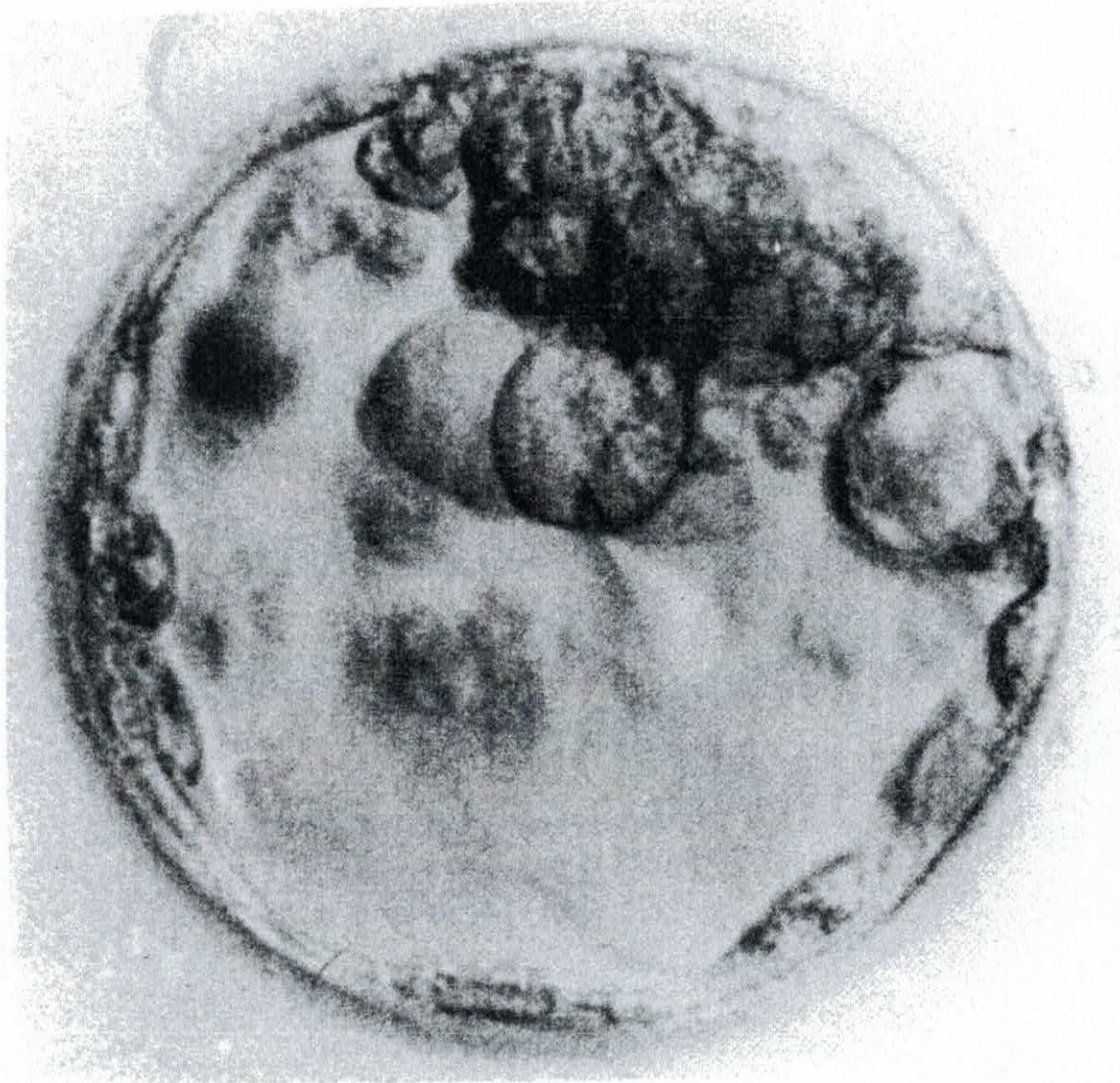


8 Cells Embryo
Day 3
transfer to uterus
A new genome begins after this.

Embryonic Stem Cells



(cloning)



Day 5
Uterus wall attachment
Day 6-6 1/2

> 1% of births; U.S.
currently

ETHICS OF EMBRYONIC STEM CELL RESEARCH

Should human embryos be used as a source for embryonic stem cells?

Classic dilemma between two ethical principles

- Mandate to alleviate pain and suffering

Embryonic stem cells have the potential to generate replacement tissues for many serious illnesses.

- Mandate to preserve and to protect human life

Harvesting embryonic stem cells from human blastocysts destroys the embryos.

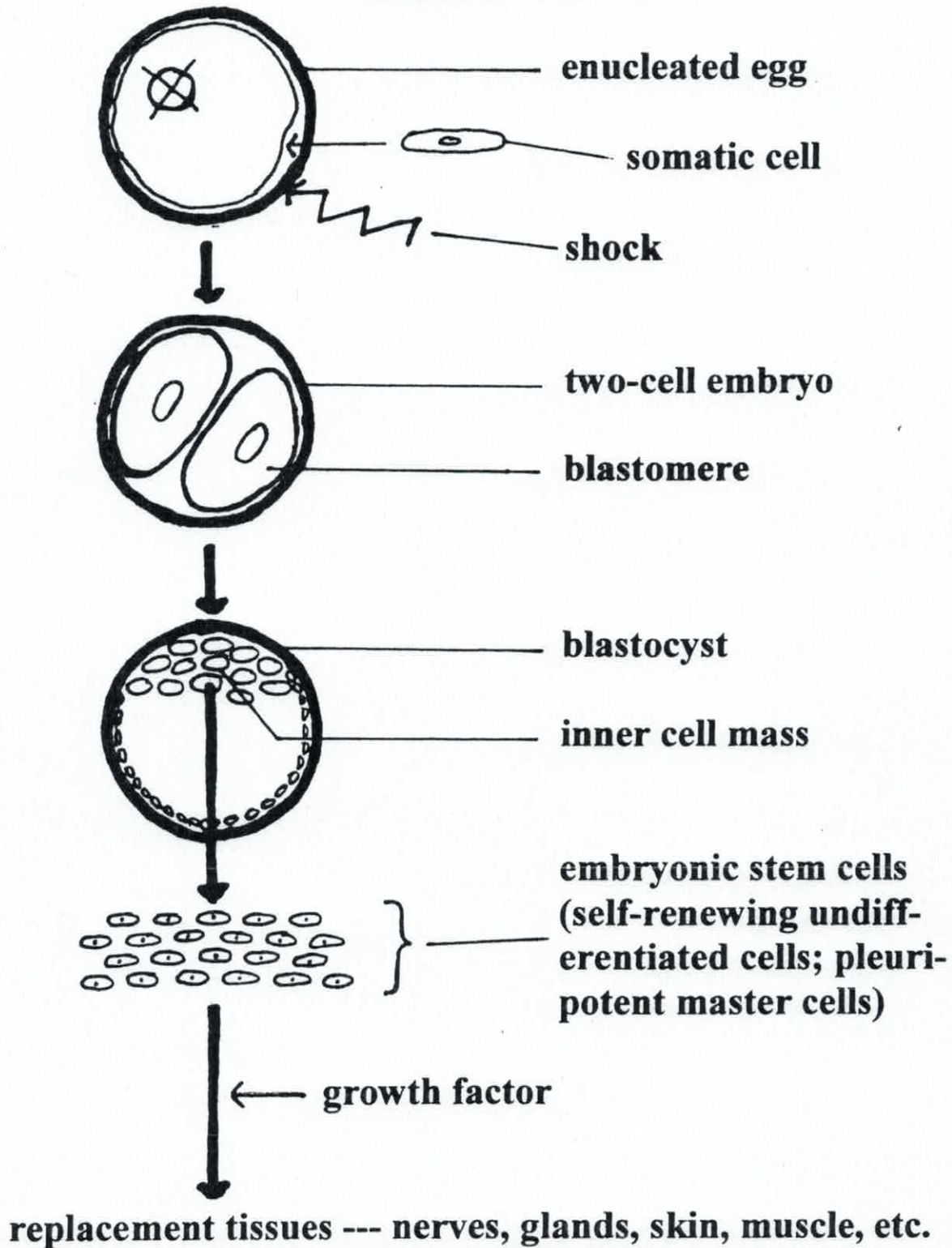
- Decision complex

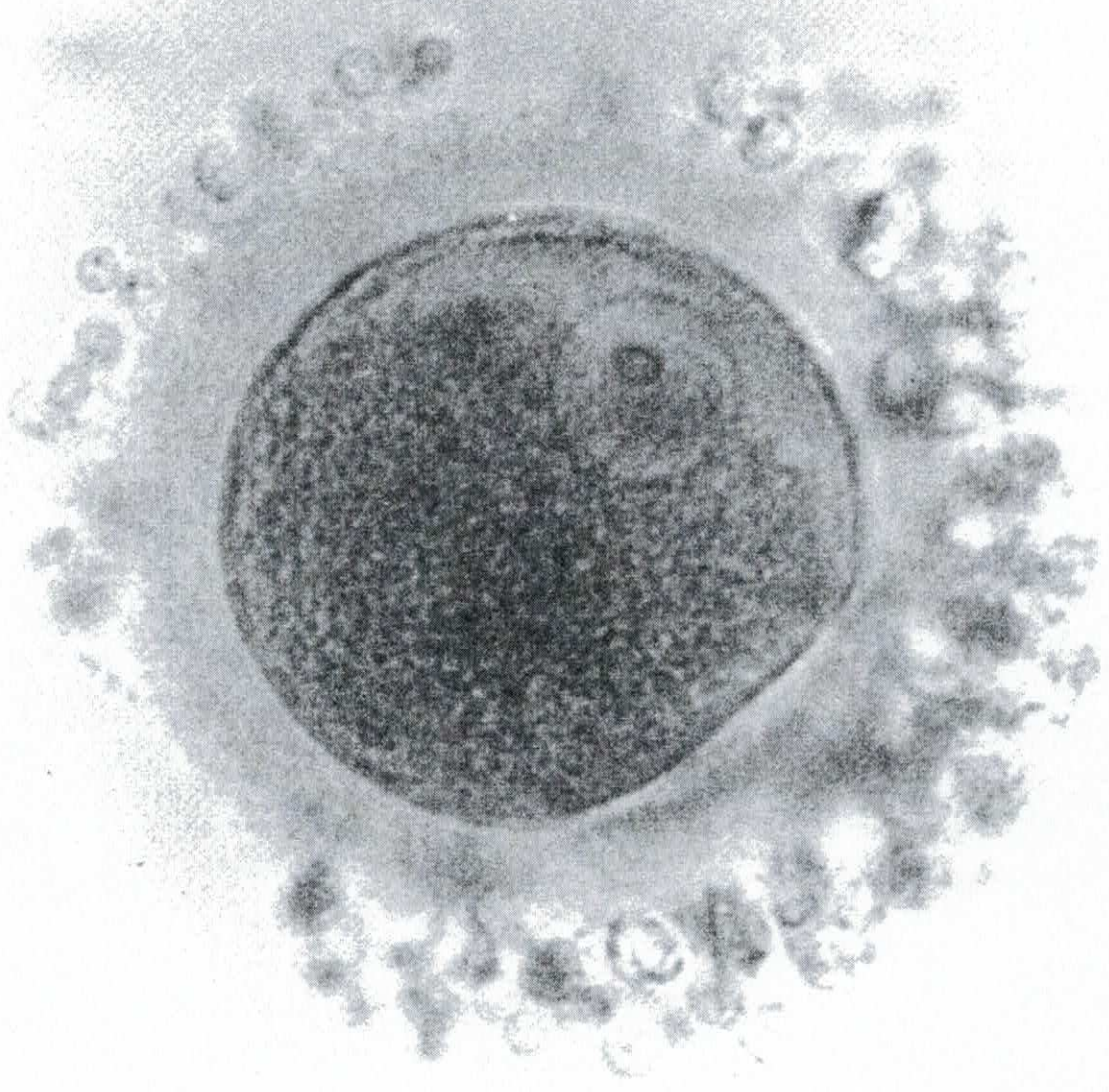
There is virtue in performing the act, and virtue in abstaining from it.

Choices entail acceptance also of some undesirable consequences.

Must violate one principle to accomplish the other.

Somatic Cell Nuclear Transfer Therapeutic Cloning





Ethical Issues Associated With In Vitro Fertilization

Issues surrounding the beginning of human life are notoriously controversial.

- When does life begin?
- When is personhood established?
- Who is a parent?
- Is a child entitled to be the product of a new unique genome?
- What is the moral status of human preimplantation embryos?
- Is the human embryo worthy of legal protection?
- Should left-over embryos be donated for adoption? For research?
- Should embryos be created for research?
- How can society regulate these new technologies to reap benefits and avoid harms?

Primary Ethical Issues

1. Is there a "magic moment" when personhood is established? *not established!*
2. What is the moral status of human preimplantation embryos?
 - ① Are they persons that would require full moral protection?
 - ② Are they just tissue or personal property?
 - ③ Are they neither persons nor property, but should be highly respected, and have limited moral protection because they represent nascent human life and have the potential to develop into persons?
3. To what degree should society promote and protect human preimplantation embryos?

Theology side
—————→
Science side

Secondary Ethical Issues

1. Providence of God – Should be good stewards of God's gift of scientific knowledge and technology.
2. Right of Privacy – Patient's rights.
 - a. Respect for privacy
 - b. Procreative liberty
 - c. Patient autonomy *Full or Limited?*
3. Altruism – Having an unselfish concern for the welfare of others.
4. Discrimination - Showing of partiality or prejudice in treatment.
5. Exploitation - Taking advantage of others for personal gain. *CA this is an issue!*
6. Social Justice - Assuring uniform access and equal opportunity.
7. Societal Responsibility – Fostering (funding and regulating) the research needed to establish the efficacy, safety, and distribution of future medical services provided to society.
8. Commercialism – Patenting and marketing of medical technology.

Biblical References about Human Life

Scripture is very specific about:

- ✚ God calling human beings. (Isa. 49:1, Jer. 1:5)
- ✚ God creating human beings. (Ps. 139:13-14)
- ✚ God forming human beings in his image. (Gen. 1:27)
- ✚ God caring about all stages of human life including the unborn. (Job 31:15, Isa. 49:1, 5, Jer. 1:5)
- ✚ God crowning us with glory and honor. (Ps 8:4-5)
- ✚ God making man a little lower than the angels. (Ps. 8:5)
- ✚ God making us rulers over creation. (Gen 1:28, Ps 8:6)
- ✚ God loving us.

Biblical References about Human Life (continued)

Scripture is not specific about:

‡ When the spiritual soul or the image of God enters the body. (Ecc. 11:5)

? ‡ When personhood begins. (Ecc. 11:5)

No "magic moment":

‡ "As you do not know the path of the wind, or how the body is formed in a mother's womb (or know how life or the spirit enters the body being formed), so you cannot understand the work of God, the maker of all things." (Ecc. 11:5) (NIV)

Focus on what is revealed:

‡ "The secret things belong to the Lord our God, but the things revealed belong to us and to our children forever..." (Deut. 29:29) (NIV)

Catholic Tradition Concerning “The Life of the Human Person Called Into Existence”

In February, 1987, the Congregation for the Doctrine of the “Faith” issued a document entitled: “Instruction or Respect for Human Life in Its Origin and on the Dignity of Procreation.”

“We proclaim that the human being must be respected as a person from the very first instant of existence. We have no special knowledge about the precise instant when life begins, when the “personality” originates. Since we do not know with precision the exact parameters of the beginning of life, we proclaim a “treatment norm” at the service of human life. We do not know when the human being “becomes” a person, or is a person, but since we do not know, we should regard the “pre-embryo” or “embryo” as a person from the moment when the process of conception begins.”

“This “treatment norm” bases itself on “choosing the safer path” when we do not have the whole picture. It shows a penchant for the tradition to link with those who focus on our genetic identity as unique”

Scientific Facts about Preimplantation Embryos

1. Completion of fertilization (syngamy) is a marker event in the overall continuum of life.
2. A distinct genetic entity is established with the formation of a new unique genome.
3. The new genome contains the complete set of hereditary factors from the genetic mother and father.
4. The new genome is not activated until after the third day.
5. Each blastomere (cell) is capable of developing into an individual (totipotent).
6. Each embryo can divide in two, can fuse with another embryo, or can develop into a tumor.
7. After 14 days, the embryo can no longer divide in two, or fuse with another embryo.
8. Early preimplantation embryos are quite precarious as from 50 to 70 percent are genetically defective.
9. Less than 50 percent of the embryos survive the first week and implant in the uterus.

Moral Status of Human Preimplantation Embryos

First Position

Human preimplantation embryos are entitled to full moral protection, as personhood is established at the completion of fertilization when a new unique genome is formed in the zygote (fertilized egg).

Assumptions

1. Personhood is established at the completion of fertilization.
2. A new unique genome is the only biologic requirement for personhood.
3. Full moral protection is required when one assumes the preimplantation embryo is a person.

First Position (continued)

Pros

1. A distinct genetic entity is established with the formation of a new unique genome.
2. The new genome contains the complete set of hereditary factors from the mother and father.
3. Completion of fertilization is a clear marker event in the over all continuum of life that moral theologians can focus on to serve as a guide in the assignment of moral value.
4. This is a "treatment norm" at the service of beginning of life technologies that bases itself on "choosing the safer path".
5. About one-third of society recognizes these preimplantation embryos as "unborn children".

*series to freeze ~~of~~ embryos
than eggs.
Eggs are larger and more sensitive
cell structure*

First Position (continued)

Cons

1. Early preimplantation embryos are quite precarious as from 50 to 70 percent are genetically defective.
2. The preimplantation stage of human reproduction is very inefficient as less than 50 percent of the embryos survive the first week and implant in the uterus.
3. Each embryo can divide into two, can fuse with another embryo, or can develop into a tumor.
4. Biologic individuality is not yet established.
5. We reduce the human self to the human genome as though genetic completeness were a sufficient condition for the recognition of a person.
6. Society does not commemorate a deceased embryo with a funeral or mass, or memorial service for a person, or a celebration of life.

Moral Status of Human Preimplantation Embryos

Second Position

Human preimplantation embryos represent nascent human life and are entitled to special respect, but not the full moral protection attributed to a person.

Assumptions

1. Human life begins with the completion of fertilization.
2. Personhood is established at a later stage of development, after the new genome has stabilized, and the embryo has implanted and achieved biologic individuality.
3. Nascent human preimplantation embryos have significant value that merits special respect and limited moral protection because of their potential to develop into individual human beings.

Second Position (continued)

Pros

1. The beginning of implantation of the embryo on Day Six is a clear marker event in the overall continuum of life.
2. The preimplantation stage of human reproduction is very inefficient as less than 50 percent of the embryos survive the first week.
3. Only the embryos that survive are “called by God” and are “fearfully and wonderfully made”.
4. After 14 days, the central nervous system starts to form (primitive streak), and the embryo no longer has the potential to divide into two, or fuse with another embryo.
5. Thereafter, biologic individuality is guaranteed, and the embryo starts out on its continuous journey for the rest of its human existence.
6. Most of society believes that personhood is established after the embryo is implanted in the uterus.

Second Position (continued)

Cons

1. It implies that “becoming” a person is a mysterious process that is not completed until sometime after implantation.
2. This is an arbitrary position based on one’s understanding of what Scripture says about the “beginning of life” and the available scientific facts about the preimplantation stage of development.
3. This position is more vulnerable to ethical instability as there is no defined “treatment norm” for moral decision making at the completion of fertilization.

Reproduction and Responsibility

Necessary Requirements to Demonstrate "Respect for Embryos"

1. Embryos should be created only for reproductive purposes.
2. Embryos should be created only by the union of an egg and sperm.
3. Gamete providers should have equal ownership and decision-making authority.
4. A pretreatment written agreement, as part of an informed consent process, should declare how the eggs and embryos are to be managed based on the moral requirements of the couple and the ART clinic.
5. Later, if there are unused embryos in storage that the couple does not want to use for their own procreative purposes, they should sign a new informed consent agreement to determine the disposition of the extra embryos.

Code of Conduct!
required

Bob developed this before any work could start!

Reproduction and Responsibility (continued)

6. It is morally feasible to donate the leftover embryos for adoption or research.
7. Saving lives through embryo donation for adoption or research is a more compelling moral reason than simply discarding the leftover embryos.
8. Embryos should never be patented, or bought and sold as articles of commerce.