

# Stem Cells, Cloning, and What It Means To Be Human

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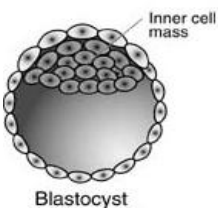
## I. Stem Cell Basics



A. Stem cells are ***undifferentiated cells*** that have the ability to divide for indefinite periods in culture, and give rise to more ***specialized cells***.

1) These are the body's **master cells**, from which all other cells "***stem.***"

B. A crucial distinction with stem cell research is there are two categories of stem cells.



1) Embryonic stem cells: these are extracted from a developing embryo (around 5-7 days) – ***harvesting these destroys the embryo!***

2) Adult or non-embryonic stem cells: all other "stem cells" are referred to as "adult" (regardless of donor age).

➤ *the key point is these cells have undergone some degree of maturation.*

a) Adult stem cells have been found in: bone marrow,  
umbilical cord blood & placentas,  
the mouth & nose,  
baby teeth,  
and fat cells.

b) More importantly, obtaining adult stem cells does not harm the donor!

## II. The Current State of Embryonic Stem Cell Research

A. Proponents of embryonic stem cell research claim that it holds great "promise" for fighting many human diseases.

1) However, embryonic stem cell research has not lead to a single therapy for human beings:

a) After 20+ years of research with animal models.

b) Even in the private sector with **NO** legal or financial restrictions.

c) ESCR has **NOT** moved out of the laboratory!

2) Indeed, embryonic stem cell research faces many serious obstacles:

➤ tumor formation;

➤ difficulty obtaining pure cultures of cells;

➤ unstable genetic expression;

➤ and, immune rejection.



### III. SCNT/Cloning

A. In theory, one way to avoid immune rejection would be to use stem cells from your clone.

1) The primary method of cloning being proposed for this is called **somatic cell nuclear transfer (SCNT)**.

a) **SCNT** takes the nucleus of a **somatic** or **non-reproductive** cell (like a skin cell) and **transfers** it into an **ovum** (egg cell) whose nucleus has previously been removed.

b) If this works, the clone is allowed to develop for 5-7 days, then it is **destroyed** by the harvesting of its embryonic stem cells which will be used to treat the donor.

➤ *since the goal is to help the donor, this is called **therapeutic cloning**.*

2) Supporters claim **SCNT** is different from “reproductive” cloning, but the first part of both procedures is identical.

3) Supporters of **SCNT** also try to argue that the new clone is not a “human being” because:

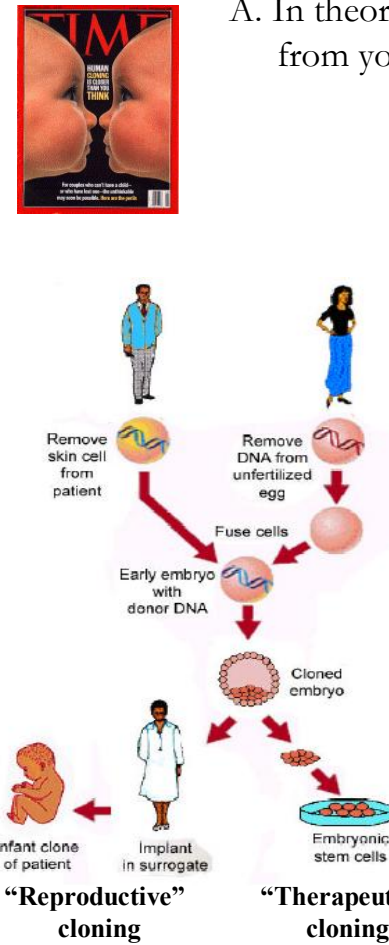
a) It is smaller than a period at the end of a sentence.

b) It was not fertilized by human sperm.

c) It won't get implanted in a uterus.

d) It is just a “clump” of cells.

e) And, it is not a new individual, but just a copy of someone else.



### IV. What does it mean to be human?

A. The pro-SCNT position rests on the belief that human development goes through a series of “stages.”

1) But **embryologists** tell us that human development is a **continuum**.

a) Biologically speaking, an embryo containing human DNA is a human being.

b) Thus if we ever do produce clones, as human beings they would deserve respect and would have to be allowed to live!

➤ *promising to destroy all cloned embryos would only make matters worse!*

### V. The Current State of Adult Stem Cell Research

A. Successful therapies have already been developed for Parkinson's, heart damage, spinal cord injury, cancer, blindness, juvenile diabetes, and more!

### VI. Conclusions: ESCR and SCNT are unethical because they destroy human beings – we can't kill one innocent human being to save another!

A. Go to [www.usccb.org](http://www.usccb.org) OR [www.stemcellresearch.org](http://www.stemcellresearch.org) to learn more!

