

Alternative Methods for Deriving Embryonic Stem Cells: Ethical and Legal Considerations

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These techniques raise challenging “border” issues

See a discussion in PLoS-Medicine last May

Henry T. Greely, *Moving Human Embryonic Stem Cells from Legislature to Lab: Remaining Legal and Ethical Questions*. PLoS Med 3(5): e143 (May 2006)

Bigger than just the immediate questions, but raise broad implications about what should be regulated

I want to start my brief comments with two points about those broader implications, then do some grouping of these various methods, and end by talking about some of the specific ethical, legal, and policy implications of this work

I. There Are Two Different Reasons We Care Especially About hESCs

Historical circumstances dictated the focus of the NAS panel and its guidelines

Two different reasons for special interest and concern

- Their Derivation from Embryos
with the ethical concerns that arouses
- The Fact that They Are Particularly Powerful, Including That They Are Pluripotent
with the medical and *other* risks that arouses (such as chimeras)

Some of these methods, if successful, would separate the two

Forcing us to ask whether and to what extent we want to regulate research that involves only one of the two issues

II. Terminological Exactitude Is Crucial

These alternative methods of possibly making pluripotent stem cells – which aren’t so new . . . John Gearhart’s Nov. 1998 fetal germ cell lines – force us to think about what we want to regulate and how

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And force us to think harder about language, both

- what the language we have used in the past *means*
- what language we should use going forward

Whether we call something a human embryonic stem cell or cell line may affect

Whether it is covered by President Bush's funding policy

Whether it is covered by various state laws banning, permitting, encouraging, or funding hESC research

Whether it is covered by the key Thomson patents, owned by WARF, which claim "pluripotent human (or primate) embryonic stem cells"

Whether they are covered by the NAS guidelines

It's important

III. Important Distinctions Among the Methods

Assume, for the present, that all these methods lead to pluripotent cells

Five distinctions among them with respect to the source cells may be useful

1. They require the destruction of what are clearly human embryos with the potential to become babies (hereafter "viable human embryos")

The Thomson method
Possibly ANT

2. They may put what are clearly viable human embryos at some risk

Possibly ANT
Blastocyst biopsy
Inner cell mass biopsy

3. They destroy or put at risk things that *might* be viable human embryos

Dead embryos
Parthenotes
SCNT
Possibly blastomere biopsy for the blastomere as new embryo
Possibly ICM biopsy with the ICM cells as new embryos

Possibly ANT

4. They do not deal with embryos but with gametes or other sensitive cells or cell sources

Fetal tissue

Germ cells

Maybe cumulus cells?

5. They do not use *any* “cells of unusual sensitivity”

Dedifferentiation from somatic cells

Adult or umbilical cord stem cells

IV. Ethical, Legal, and Policy Issues that Follow

A. Ethical

Which methods any person finds more or less acceptable should follow pretty directly, I think, from those distinctions

With a question about cells differentiated from them or other derivatives

B. Legal or Quasi-Legal

The Dickey-Wicker amendment

Cannot use federal funds to destroy, harm, or put at risk an embryo

Though Dickey is only relevant if NIH is willing to fund anyway

May be clear for some of these methods, in either direction, and unclear for others

The Bush Policy

Cannot use federal funds, directly or indirectly, for research that using non-approved hESC lines

Clear for some, not for others

The NAS

Should its guidelines extend to other methods of making pluripotent cells?

For some issues, depends on whether they have the special sensitivity of embryos

Special informed consent is mainly because of embryo

But not all – chimera informed consent

I believe the NAS needs to say whether or not its guidelines would apply fully to these various alternatives (and hence whether or not ESCROs should oversee them)

And, while I’m on the coverage issue, also whether you are covering cells differentiated from hESCs or other derivatives from those cells

Given pluripotency issues, I think you should, for the most part, cover them all to some extent

But that might require some variation in what the guidelines are
For less sensitive derivation, less concern about it

C. Policy

Let 100 flowers bloom

Unless or until one of these alternative methods proves useful, the only policy question is one of funding priorities

Fund methods that have more hope of
Producing useful cells and
Avoiding ethical concerns

There is a very interesting, but still hypothetical, policy problem that *may* need to be dealt with

What if one of these methods clearly avoids the ethical problems (say, somatic cell dedifferentiation) and also *clearly* produces stem cell lines as useful as those produced by the Thomson method

In that case, should Thomson method no longer be funded?

Should the Thomson method be banned?

But that is not today's question – or, I strongly suspect, the question anytime in the next five or ten years

Right now, governments, private funders, and other actors have to make their decisions considering both the greater promise of Thomson cell lines right now and their own ethical positions.