21A.216J Dilemmas in Bio-Medical Ethics
2005/4/20 (W), Week 11, Class 20

Readings
Brian Alexander. 2003. Rapture.
Handout: Presentation handout by Professor James Sherley

Class Business
returned first paper

Presenter: James Sherley

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Cellular and molecular biologist
Research: cancer, aging, environmental health and adult stem biology and applications; adult stem cell biology, adult stem cell therapeutics, environmental health research

"Playing God or Doing Good: The Stem Cell Debate, Undisclosed"

Proposed Outline (we might not get through it)

I. Sources of human stem cells
   A. Embryonic
   B. Adult
II. Framing the moral question
III. Message Motivations – see the different groups involved in this debate
IV. Disclosing scientific objections – exploration of non-religious, non-moral objections
V. Science and public disclosure
VI. The human-animal nexus

Zygote →
blastocyst (embryonic stem cells, programmed to give rise to many types of human cells, pluripotent) →
gastrula →
adult stem cells:
    ectoderm—epithelial
    mesoderm—cardiac, skeletal, kidney, red blood, smooth
    endoderm—pancreatic, thyroid, lung

germ cells—sperm, egg

Should we be destroying embryos and using them for research?

Sources of Human Embryonic stem Cells

1. In vitro fertilization (IVF) (not so natural) – sperm + egg = IVF embryo, complete nucleus
   Embryonic stem (ES) cell production
   IVF embryo → dissociate = ES cell culture
   "convert ES cells to mature tissues" = "CURES"

2. Reproductive cloning (dismissed by most)
   egg – incomplete nucleus = enucleated egg
   enucleated egg + complete somatic nucleus = **cloned embryo[d]**

   leads to defects; cloned animals have early aging, early tumors, general defects;
   main arguments against making humans from this method
   clones have unexpected, unpredictable defects in their lifespan

   Therapeutic cloning ("somatic cell nuclear transplant")
   cloned embryo[d]→ dissocate = ES cell cuture
   "convert ES cells to mature tissues" = "CURES[d]?"

   cell transfer will not create an immune reaction; involves making an embryo and destroying it

   what is the difference between IVF and clone embryos

3. (Natural human fertilization in utero—not in discussion)

II. Framing the moral question

1. Are embryos alive? If they are not alive, we don't need to care.

Scientifically, no question. Able to autonomously take up energy and convert it into work. Cells are the unit of life on the planet. (Scientific argument)
Zygote is alive, also.

Scientific death is also defined in that way.

Bodily death v cell death are related but they are different.

"autonomous" in anthropology and science

might want to add "self-replicate" to definition, not simply converting energy to work?

2. **Are embryos human?** If they are not human, then we don't have any problems
human person: certain qualities of a person—if that is a metric, then they don't qualify

human personality: it seems unlikely? from western perspective

human traits: complete human genome; how much of the traits they have depends on their stage of develop; they have that potential; they are alive

human potential: each person has the potential; what we can do in the next moment or time frame; what we can do going forward defines what we are now;

genes?
think; cognitive ability?
some debate whether learning or conditioning (knowing that you know something)
sense of morality? sort of comes back to cognitive functions
children, Terri Schiavo?

human or what else could they be?

are they human? if they are not human, what are they? are they a human being??
what is a being??
discussion of autonomy
other cultures view… for example, not all view human autonomy

what is human
what is a person

What is their moral status? (questions one and two need to be addressed; scientific questions)

2. Are cloned embryos worthy humans?
"defective humans"
can cloned embryos be defective humans; if IVF embryos are not considered human at al?
Eugenic v compassionate society?

1. given that embryos are alive?
2. and embryos are human?
3. what rights should we accord them?

The fundamental moral problem: destroying non-consenting, living, human beings for the gain of others

Counter Arguments:
"Use existing human embryonic stem cells"

Using existing human embryonic stem cell is morally inconsistent.
"Fencing stolen goods"
"Exploiting the riches of the murdered"
Motivation?

III. Society or individual comments/opinions. What is motivating that particular position?

What is the type of reasoning that prevents certain kinds of activities from happening or not?

Counter Arguments:
IVF surplus embryos: "Discarded anyway."
Moral consistency and social order require that they not be destroyed for the gain of others.

Make fewer! Interment, cremation, absorption, indefinite preservation; many parents view their embryos as children on life support. How humans think about underdeveloped humans?

Society could say that

IVF is not regulated in any substantial fashion.

analogy: fruit tree of neighbors, rotting, taking those fruit or leave them to rot

Turn the fruit into babies. If we're talking about human beings, the analogy does not hold? Adoption for better care, for the benefit of the child and new parents. But we don't allow them for slavery, for research. In case of "excess" embryos, they will probably never become babies anyway.

But we allow for aborting babies. Not killing embryos = aborting babies?? In case of "excess" embryos, they will probably never become babies anyway.

How are the two scenarios different? To terminate the fetus or not, for embryos—who makes the decision?

Counter Arguments:
Don't use public funds, but okay to use private funds?? Morally inconsistent.

Don't make or use cloned embryos, but okay to use IVF embryos?? Morally inconsistent.

Additional Undesirable Societal Impact:
devaluation of groups associated with the victims of immoral acts
women, the egg donors

economic and educational disadvantaged affected disproportionately

Review boards
Senator Brownback (Kansas)—make it criminal to destroy embryos in any setting

Tiers in the market for which genetic material is a more important commodity
Cloned embryos—making individuals

IV. Complex Motivation = Complex Messages from Stakeholders
Politicians—erroneous rhetoric
Scientists—fame, competition, curiosity, medicine, monetary, personal
Clergy—theological principles
Ethicists and philosophers—academic?
Media—education v hyperbole, sales
"even altruism can be selfish"

V. Disclosing scientific objections
How do you use stem cells to cure adult tissues?
Adult stem cells: an alternative?
Argument: not pluripotent; not in every tissue needed;
Who needs pluripotency? Patients don't need pluripotency.

Most adult tissues undergo continuous renewal
Death
terminal arrest
differentiation
symmetric
cell kinetics
asymmetric

Skin—in general skin is the same from week to week; but they are the same cells, they are dying and getting replaced. Memory of what skin cells should be. Even some evidence that the brain turns over as well.

How do we do cell therapy with adult stem cells and how does that compare with ES cells?
Cell therapy with adult stem cells
normal tissue → damaged or diseased tissue (autologous allogeneic informed consent) → (adult stem cell expansion) → repaired tissue

ES cell therapy
normal tissue – damaged or diseased tissue – short lived repair

sources: IVF embryos, cloned embryos
Moral issues: epigenetic defects[d] → develop → purification (es cells) → short-lived repair

must eventually become adult stem cells
isolate, stabilize, expand adult stem cells
likely that ES cells will be defective

Why not just use adult stem cells? all the moral, ethical issues would be eliminated and the debate around embryos would be gone.
ES stem cells multiply more quickly in vitro and are pluripotent; we are focused on their properties—underdisclosure however. What is a problem? In vitro, they make a ton of cells; in vivo, they produce tumors.

Why not just use adult stem cells?
Research challenges

1. hard to identify
2. hard to isolate
3. hard to grow

But not impossible to identify, isolate or grow

Is there an economic analysis done on this? It is very expensive nevertheless. Getting human bone marrow, liver is very expensive. What about blood donations for cost?

Chimeras, animal-human nexus

human to human transplants – medicine
animal to human transplants – medicine
human to animal transplants – research
"humanization" – mis-language—making the mouse more human with human blood cells?

Urban Weissman's work: human neuron's into mice; the probability that it will lead to cognitive function is very low.

human-animal embryonic chimeras – research
In animal human embryos? idea that embryos formed from chimeras—make human sperm from mouse; it's plausible. The 3 if's rule. the impact will be minimal? it won't happen?? so we shouldn't worry about it.

But what about the use of defective humans for exploitation?

