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The environments of stem cells — biology, ethics and policy

When sperm and egg meet in the appropriate environment, usually a Fallopian tube, but increasingly and interestingly a Petri dish, things happen: biologically, ethically and politically.

Biologically, this combination of nucleic material begins to divide, yielding 2 cells, then 4, then 8 — until, after 14 days, the preimplantation embryo (blastocyst) contains about 100 to 140 cells. Twinning can occur during this period, but not after. Stem cells, a population of cells within the blastocyst, have the capacity for continuous and seemingly indefinite replication and, given the appropriate environment, the potential to differentiate into many cell types. Their unlimited proliferative capacity, together with the relative ease with which they can be identified, extracted and cultured, make embryonic stem cells intensely interesting to researchers seeking new therapies for diabetes, parkinsonism, spinal cord injury and other conditions. They appear to have more potential than stem cells obtained from fetal tissue after elective abortion, or from adult tissues.

The ethical environment of harvesting adult stem cells is relatively straightforward (adults can give informed consent), and the use of fetal tissue in research is already covered by the Tri-Council guidelines.¹ But the harvesting of stem cells from living embryos is a recent innovation not anticipated by such guidelines. Removal of the cells results in the destruction of the embryo, leading researchers into disputed ethical ground. Some believe the 14-day-old blastocyst, because it is capable of splitting into two or more embryos, has no inherent individuality.² Others disagree, believing that such embryos have a moral claim on society and should be protected.³

The Canadian Institutes of Health Research (CIHR) moved into this thorny terrain to issue new policies and rules for federally-funded research using human stem cells⁴ (see News, page 1077). The

new policy permits harvesting of stem cells from “spare” embryos created by in-vitro fertilization, prohibits some research such as human cloning, creates a registry of all stem cell cultures and makes them available to all researchers, and outlaws payment for donated embryos or stem cells. And, recognizing the sketchy ethical framework in this area (and perhaps the inadequacies of the current system of local research ethics boards), CIHR has created a National Stem Cell Oversight Committee to provide ethical review of all CIHR-funded research involving human stem cells.

These policies are both timely and reasonable. But what about privately funded stem cell research? This is not regulated by CIHR guidelines. So-called “Nasdaq” biomedical research is spreading like purple loosestrife over Ontario wetlands. We need federal legislation that will govern *all* stem cell research conducted in this country. Neither the scientific community nor the public should be satisfied with a double standard by which privately-funded research is effectively exempt from ethical scrutiny and regulatory safeguards. The House of Commons Standing Committee on Health has reviewed a proposal for legislation. Many countries in Europe and elsewhere have enacted legislation.⁵ We need to do the same. — CMAJ

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