

Embryos, stem cell research, and the promise of health

Comment on Gurmankin, Sisti, and Caplan

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In this issue of *Politics and the Life Sciences*, Gurmankin, Sisti, and Caplan report useful original data on the embryo-disposal practices of a good sample of *in vitro* fertilization (IVF) clinics in the United States. Their paper has important implications for the broadening debate about potential uses of cryopreserved embryos. Since a large proportion of these embryos will never be used for reproductive purposes, the primary choice becomes one of disposal as biological waste material or use in medical, primarily stem-cell, research. Although the authors rightly do not discuss these issues in this short research article, the question of the advisability and acceptability of such directed uses is most timely.

Another set of issues raised by the authors relates to consent for disposal and, indirectly, to ownership of “extra” embryos. Clearly, the authors’ suggestion for full disclosure of disposal options at time of enrollment is long-since overdue. However, while the majority of clinics include donation-to-research as an option, these data do not clarify the context within which this and other options are presented to patients. What information, if any, is given to patients to help or influence their decisions? I imagine that most patients would choose to “donate” their embryos to research rather than having them destroyed as biological waste after a certain period, if presented with such a choice clearly expressed. Not addressed is why we have so many spare embryos in the first place, given the risks now associated with hyper-stimulating ovaries to increase egg production prior to laparoscopic harvest. This question takes us to another: should American IVF clinics adopt standards and accept regulations similar to those developed by the Human Fertilisation and Embryology Authority in the

United Kingdom? Although the advantages would likely be many, as the HFEA appears to be a success in the UK,¹ American professional practices will undoubtedly remain disparate and patient experiences inconsistent, making studies of the type published in this issue ever more critical.

The authors’ contribution — published online-before-print 9 August 2004 for the third anniversary of George W. Bush’s announcement of a federal stem-cell research policy — is especially timely in light of a front-burner debate now heating up American electoral politics. Despite little public understanding of terms or underlying science, distinctions among embryonic and other types of stem cells (*i.e.*, adult-derived and umbilical-cord stem cells), differences between therapeutic and reproductive cloning, and distortions of the reality (if not the promise) of stem-cell research have become startlingly emotive fixtures of the 2004 presidential campaign, widely referenced by John Kerry, Ron Reagan, and others at the Democratic Convention. As usual when an issue becomes political, rhetoric on all sides tends to blur the facts. While I believe they are mistaken regarding the use of spare embryos, opponents of embryonic stem-cell use are wise to fear the creation of embryos expressly for research purposes, particularly if the more optimistic forecasts of proponents do in fact eventuate. Demand for stem cell sources would then expand rapidly because of huge commercial stakes in research and an ineluctable drive for rapid diffusion of clinical applications. Of two options to meet a burgeoning demand for cell lines, the first, permitting production of human embryos specifically for research, remains highly improbable in the current US political climate. Thus,

the second, increasing the number of spare embryos available for research by utilizing the hundreds of thousands now stored, as reported in this paper, is more likely. One should note that a danger in limiting research to spare embryos is establishing a non-clinical incentive to make them — to produce more embryos per ovum-retrieval cycle than needed to maximize the likelihood of successful pregnancy.

Stem-cell therapy will have widespread applications in medicine and may be the key to innovative treatment of numerous diseases and conditions. Politically, stem-cell proponents have expanded the base of constituents who believe they might benefit from such research. Already, despite the lack of anything approaching evidence of the efficacy and even the safety of stem-cell applications in humans, expectations of the afflicted have been raised and demands for “access” heightened. Those who stand in the way are cast as villains. Demand, in turn, will increase pressures on the research community to proceed rapidly toward broader clinical trials with an eye toward quick approval for use.

However, many claims are troubling. For instance, researcher James Thomson states that “possibilities are limitless,” because “stem cells can give rise to potentially everything, and they never die.” Every kind of tissue can be grown from scratch — heart muscle, bone marrow, brain tissue — in as much quantity as necessary.² Similarly, Larry Lipshultz concludes that embryonic stem cells have the ability to become any tissue or organ in the body. Therefore, the possibilities for their use in treatment of disease are limitless. “Organs could be developed without the fear of recipient rejection; cures for diabetes, Parkinson’s disease and other neurodegenerative diseases could be uncovered; spinal cord injuries could be treated; and improved therapies for burn patients could be developed.”³

More problematically, the press tends to extrapolate firm benefits from highly tentative forecasts, as displayed in scores of headlines from newspaper reports of early stem-cell research findings: “The Chance to Make Repair Kits for People,” “Stem Cells May Restore Neurons,” “Brain Repair Tool Kit,” “Stem Cells Can Repair Damage to Liver,” “Scientists Can Now Grow All Purpose Cell in Labs,” “Experimental Cell Promising for Parkinson’s,” “Pig-Cell Procedure Gives [Christopher] Reeve Hope of Walking Again.” Over the past four years, headlines have remained sensational, though often the articles that follow have been marginally more

circumspect: “Imagine a day when doctors can order up body parts from a lab to replace our ailing organs, or when they can inject special ‘smart’ cells in to a patient’s diseased heart to replace dying tissue. That day is now one step closer.”⁴

The current response to very preliminary findings on the value of stem-cell therapy is highly reminiscent of past “breakthroughs” in medical research. In the 1960s, for instance, Congress was told by scientists that if we declared “war on cancer” and poured in research funding, cancer would be beaten. Similarly, in the 1960s and 1970s, Congress was promised a totally implantable and affordable artificial heart in a decade if funds were forthcoming. Then, in the 1980s, groundbreaking work in genetics and biotechnology was translated into highly enthusiastic predictions. Gene therapy, we were told, would revolutionize medicine in short order, but even the more modest gene-therapy forecasts has yet to be realized, with signal projects often cut short because of safety concerns, even scandal. The same holds true for promises of AIDS researchers in the mid-1980s, some of whom contended that with enough research funds we would have an effective vaccine by 1990. In the US particularly, a technological-fix mentality dominates, with elusive hopes of illusionary solutions attracting capital — and Congress. Although one cannot deny that medical science has made impressive technical advances, advances that at times immeasurably help individual patients and often *exceed* expectations, promises of early breakthroughs have routinely gone unkept.

Even in the best of circumstances, stem-cell research is unlikely to deliver all the goods boosters now suggest: reversing paralysis, growing new organs, conquering diabetes and cancer, reversing the effects of neurodegenerative diseases such as Alzheimer’s and Parkinson’s, repairing heart-attack damage, restoring eyesight, creating neural tissues programmed to repair spinal-cord injuries, growing full-thickness skin wherever burns have destroyed it. It is unfortunate that the political situation forces proponents of stem-cell research to embellish their case or conjecture unrealistically. Importantly, as time hyperbole raises false hopes it diverts resources that could better be used for preventive medicine and public-health promotion, where gains are likely to be more impressive overall.

But what if I am being too skeptical and stem-cell research *does* meet high expectations and revolutionizes

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health care? For the sake of argument, let us assume that the boosters are right. We will then have serious allocation questions. Should we treat the 14 million Americans expected to have Alzheimer's disease in 2015? Or, perhaps for less money, the roughly 400 million people, worldwide, who might then be suffering with bladder diseases thought amenable to stem-cell facilitated treatment?

Unfortunately, emergence of these new interventions is promised for a near-term future in which health-care will be demanding a share of social resources even more disproportionate than it does today. Clearly, we must allocate resources to those areas most likely to contribute most efficiently to health. To date, cost-benefit projections of stem-cell research applications have been vague, understandably so at this early stage of development, since costs are not accounted and benefits have yet to accumulate. Still, analysis of this sort is crucial before any major medical technology is widely diffused. The history of even modest medical breakthroughs has been to escalate costs significantly, and we have little reason to believe that those applying the results of stem-cell research will be any different. While high cost is not reason enough to impede diffusion of potentially useful techniques, it must be a factor, however alien to our professed values; full

policy analysis is not possible otherwise. Unfortunately, we are so possessed by the ethical debate about using embryos that we have yet to consider adequately the impact of unrealistic expectations on a larger moral question: how to allocate health-care resources overall. A single controversy — the *source* of cells — drains discussion from this broader and more crucial question.

Stem-cell research by all means. Or by almost all. But *not* without more careful analysis of attendant costs — and far more cautious consideration of the tradeoffs those costs will force.

References

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