Moral Issues of Human Embryo Research

IN HIS ESSAY "MORALS AND PRIMORDIALS," Louis M. Guenin's thesis is that the use of embryos in research is morally acceptable "not because experiment and derivation are distinguishable, but because both are permissible" (*Science's* Compass, 1 Jun., p. 1659). With regard to the position of the Catholic Church on this issue, however, Guenin does not follow the logic of his own argument. As he states, the Catholic Church does not hold in vitro fertilization, cryopreservation of embryos, or destruction of embryos to be morally permissible. Therefore, by his own logic, the Church should hold research on these embryos to be wrong—which it does.

Guenin's counterargument, that because "in vitro fertilizations nonetheless occur" we are therefore morally justified in using the resulting embryos, is specious. This same argument—akin to "I didn't personally do it, and somebody else was going to do it anyway, so it's all right for me to benefit from it"—has been advanced to justify buying clothing made by sweatshop labor and to defend downloading child pornography from the Internet. The argument doesn't work in those cases, either. If it is wrong to create the "product" in the first place, then it's wrong to receive it and wrong to benefit from it.

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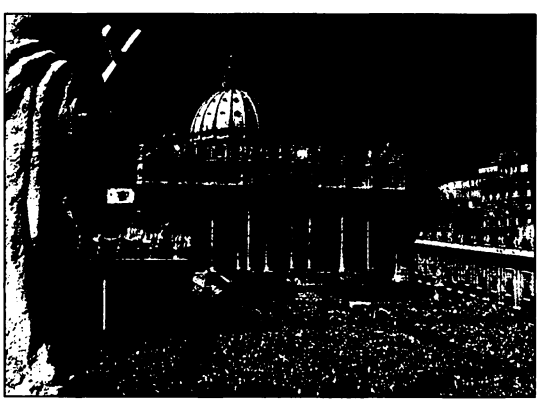
Response

MUNN TAKES ME TO NEGLECT COMPLICITY IN wrongdoing. The putative wrong is in vitro fertilization (IVF). First, I observe that when it is wrong to effect x, it is not always wrong to benefit from x. The Catholic Church does not condemn research on donated abortal tissue if the investigator has in no way induced the abortion (*1*). Complicity is a function of the nexus between wrongdoer and accomplice. Consumers of the products of slavery and child pornography are complicit in such practices, if they are, because demand coaxes supply. But, for example, we do not regard parents as complicitous in all wrongdoing by their offspring. Stem cell science neither motivates nor facilitates IVF. On the other hand, stem cell investigation induces embryo destruction. After drawing attention to the moral nexus between immunosurgery to obtain blastomeres and the subsequent study of derived stem cells, I defend such immunosurgery as morally superior to what would otherwise occur. I urge that we not plunge epidosembryos (*2*) into autoclaves when, at the behest of epidosembryo donors, we can aid others by deriving stem cells.



Is embryonic stem cell research completely incompatible with the current teachings of the Catholic Church?

Second, one could reply that fertility patients effect no wrongdoing in which to be complicit. Catholic teaching disapproves of IVF on the grounds that it is nonconjugal and could lead to eugenics. Consider then a married woman who conceives nonconjugally with no thought of eugenics. Can anyone know that God disapproves? Alternatively, it may be objected that IVF is immoral precisely because it invariably orphans some embryos. That objection lacks force because clinicians either transfer or freeze IVF embryos before the 14 days of development needed to establish individuation, a necessary condition of personhood. Nor do possible persons correspond to embryos that will never enter a womb. Lastly, we have the case of creating embryos solely for use in research or therapy in aid of others. In this case no illicit reproduction occurs. Still, may it obtain that to every cell type corresponds a purpose, and that it is wrong to hijack gametes for a nonreproductive purpose? Aristotelian teleology has lost its former hold on our thought. We welcome instances in which cells prove beneficially adaptable. For gametes, we may find new medical uses. When consumed on day 5 in research or therapy, the products of combined gametes—and the products of somatic cell nuclear transfer—have not become persons. Esteem for life furnishes a compelling moral reason to create, donate, and use unenabled, unidividuated embryos in beneficent research and therapy.

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References and Notes

1. Congregation for the Doctrine of the Faith, *Donum Vitae* (Vatican City, 1987).
2. As I defined it in my Essay, an epidosembryo is a human embryo that "(i) was created in vitro in an assisted reproduction procedure, (ii) remained in storage after completion of all intrauterin transfers requested by the mother, and (iii) has departed parental control according to instructions to the attending physician that the embryo shall be given to research...."

Stem Cell Research Has Only Just Begun

IT IS TRUE THAT NO ADULT STEM CELL HAS yet been shown to differentiate as effectively as embryonic stem cells (ESCs) into several cell types that show great promise for treating some diseases. However, contrary to some statements in Gretchen Vogel's News Focus article "Can adult stem cells suffice?" (8 Jun., p. 1820), some adult stem cells can be grown well enough in the laboratory to be considered for therapeutic applications.

More than 20 years ago, Friedenstein and then others (*1*) grew adult stem cells from bone marrow called mesenchymal stem cells or marrow stromal cells (MSCs). MSCs differentiate into bone, cartilage, fat, muscle, and early progenitors of neural cells. Human MSCs can be expanded up to a billionfold in culture in about 8 weeks (*2*). Preliminary but promising results have appeared on the use of MSCs in animal models for parkinsonism, spinal cord defects,

bone diseases, and heart defects (*3*). Also, several clinical trials are in progress (*4*). In addition, there are promising results with other adult stem cells that perhaps we may yet learn how to grow effectively (*5*). We do not yet know enough about adult stem cells or ESCs to make dogmatic statements about the limitations of either.

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5. K. A. Jackson *et al.*, *J. Clin. Invest.* **107**, 1395 (2000); P. A. Zuk *et al.*, *Tissue Eng.* **7**, 211 (2001); D. Orlic *et al.*, *Nature* **410**, 701 (2001); A. A. Kocher *et al.*, *Nature Med.* **7**, 430 (2001); D. Krause *et al.*, *Cell* **105**, 369 (2001).

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted by e-mail (science_letters@aaas.org), the Web (www.letter2science.org), or regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

AS THE PRIMARY AUTHOR OF A RECENT PAPER in *Tissue Engineering* (*1*) detailing a multipotential cell line in liposuctioned fat (PLA cells), I am responding to the discussion of that paper in Vogel's News Focus article. The recent public attention of our work has not deluded us into thinking we have found the "ultimate" stem cell. Indeed, we still have a way to go to conclusively prove that these multipotential cells are indeed stem cells.

We agree with the various comments that our findings might be due to contamination of the fat depot with hematopoietic or mesenchymal stem cells (HSCs and MSCs) from bone marrow, a possibility we discuss in our paper. However, the likelihood that our high differentiation levels could be achieved by contamination by these cells seems remote. HSCs and MSCs are likely to be found in negligible amounts in fat. Even so, if PLA cells are another MSC or HSC population, to the clinician it is of no consequence. Ultimately, all that matters is a reliable source of multipotential cells that achieve the desired results in the clinic.

Finally, in response to the criticism that we "report[ed] no sign that the [PLA] cells could become nerve cells or...pancreatic cells," our manuscript was an initial study meant to characterize only the mesenchymal potential of PLA cells. Perhaps the take-home message from our results is that stem cells might be found in several tissues other than the established sources.

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Prospects of a Revived OTA for Congress

THE WORKSHOP TO DISCUSS RENEWING A science advisory capacity for the U.S. Congress is the topic of David Malakoff's News of the Week article "Memo to Congress: get better advice" (22 Jun., p.