

Shaky arguments against stem cells

Recent attempts to use scientific findings to discredit embryonic stem cell research are distorting the state of the field.

Last year's midterm elections shifted the balance in the US Congress in favor of proponents of human embryonic stem cell (hESC) research, suggesting that many citizens are not convinced by the moral argument that all human embryos (including those abandoned and indefinitely frozen in fertility clinics) are sacrosanct and may not be destroyed for any reason. In an attempt to find new arguments against hESC research, the opponents are now trying to spin science—both its problems and successes—to fit an anti-scientific purpose.

A prime example is the recent piece innocently titled “What We Know about Embryonic Stem Cells” in the conservative Roman Catholic magazine *First Things* (http://www.firstthings.com/article.php?id_article=5420). The article, which was written by Maureen Condic, Associate Professor of Neurobiology and Anatomy at the University of Utah, does not mention the fundamental moral arguments that underlie Catholic opposition to hESC research. Instead, Condic lists the practical difficulties of stem cell science, arguing that these are so severe as to be insurmountable. She is correct in asserting that there are formidable hurdles to overcome before hESCs might serve therapeutic purposes. Major problems include the low survival rates of transplanted stem cells *in vivo*, as well as the dangers of severe immune responses to cell transplants and of tumor formation. However, from a scientific perspective, these hurdles are no reason to abandon the search for stem cell therapies. They instead call for redoubled research efforts, if mostly in animal models at present.

In her effort to discredit hESC research, Condic also marshals disgraced hESC data forger Hwang Woo-Suk, reminds us that the cloned sheep Dolly lived only half a typical ovine lifespan (the connection to hESC research being rather tenuous), and enumerates the millions that have been spent on stem cell research without having yielded any real therapy yet. It is surprising to hear a professional neuroscientist present such polemical arguments. Condic's own work is concerned with finding ways to enhance regeneration of injured CNS axons. Over the decades, a lot of money has been sunk into that field without making any quadriplegics walk, but nobody, presumably not even Condic, would argue that we should stop pursuing this line of research.

Another way of spinning science against science is evident in the report “Advancing Stem Cell Science without Destroying Human Life” issued in January by the White House Domestic Policy Council (http://www.whitehouse.gov/dpc/stemcell/2007/stemcell_010907.pdf). The authors list a few recent papers reporting isolation of stem cells from non-embryo sources to argue that the morally suspect hESC research is entirely unnecessary. In this way, the report manages to turn scientific success into a saber to be wielded against further research.

To some extent, it is heartening to see the administration—with its poor record on scientific matters such as climate, evolution and of course stem cells—even take note of scientific progress. In contrast to Condic, the anonymous authors of the White House report state directly that their opposition to hESC research is based on the conviction that no human embryo may ever be deliberately destroyed for any purpose. There is a limit to the report's directness, though. A report that fusion with hESCs can confer stem cell characteristics to human fibroblasts¹ is touted as opening a potential way toward obtaining human stem cell lines equivalent to hESCs without the need for embryo destruction. The report, however, does not mention that the hESC line used in the study² was derived in 2004. Thus, this work was never eligible for federal financing (available only for work on a small number of hESC lines derived before 2001) and would not have been undertaken if the administration's position on stem cell ethics had prevailed among scientists and private funding agencies.

The report also states that the NIH clinical trials database currently lists 1229 trials based on stem cells not isolated from human embryos, compared to zero clinical trials using hESC-based approaches. In light of the enormous barriers to hESC clinical research, it is hardly surprising that there are no hESC-based clinical trials. Pre-clinical and clinical research is very expensive, the political climate discourages for-profit pharmaceutical companies from investing in the field, and the hESC lines that are eligible for federal grants to nonprofit institutions are unsuitable for use in humans for a number of reasons.

The President's Domestic Policy Council is a group of White House staffers currently headed by Karl Zinsmeister, a former political journalist, so it is not clear whether any scientists were involved in drafting the report. Nevertheless, this group should realize that they are guilty of circular reasoning if they argue against support for hESC research by pointing out its comparatively slim record of success—which is caused precisely by the lack of financial support. The record of hESC research would look much better if it operated on a level playing field, with the same competitive grant-based financing mechanisms as any other biomedical research.

Certainly there is no guarantee that hESC research will ever lead to breakthrough therapies, and the ethical argument against destroying embryos deserves respectful consideration in the debate. We cannot accord any respect, however, to the disingenuous distortion of scientific arguments. We urge the stem cell combatants to apply the same scientific standards to hESC research as they would to any other field. The current state of hESC research justifies neither hype nor desperation.

1. Cowan *et al.* *Science* **309**, 1369–1373 (2005).

2. Cowan *et al.* *New Engl. J. Med.* **350**, 1353–1356 (2004).