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Change the record

A paper in the March 12 issue of *Science* from a group of South Korean researchers reports the derivation of embryonic stem (ES) cells from a cloned human embryo. Besides proving that the cloning of human embryos is indeed possible (see p. 399), the paper should be a wake-up call for both the Bush administration and its advisors.

Currently, to receive federal funding, US researchers are directed to use only human ES cell lines approved by the government. Although there are 78 stem cell lines in total (*i.e.*, those cultured before the President's August 2001 announcement), only around 15 are sufficiently characterized to be suitable for wide distribution. This is stifling research because US investigators rightly question their long-term prospects in a field where there's uncertainty over both reagents and funding.

In January, the President's Council on Bioethics, a federal advisory committee established to "advise the President on bioethical issues related to advances in biomedical science and technology," produced its latest report: *Monitoring Stem Cell Research*. Far from providing recommendations and guidance on how to improve the present situation in human ES cell research, its 400 or so pages (with four chapters and 14 appendices) contains not one scrap of useful advice or guidance. So much for the council's advisory role.

In fact, since its creation in January 2002, the Council on Bioethics has increasingly been retreating into intellectual irrelevance. Not only is it failing to provide clear guidance to the US President and his advisors on how to tackle stem cell issues, but also it appears to be increasingly under the influence of one man, namely, its chairman, Leon Kass.

The first project tackled by Kass and his 17-person committee was human cloning and its implications for 'human dignity.' In a report published in July of 2002, the panel rightly concluded that cloning-to-produce-children (reproductive cloning) is unethical and ought to be banned. Therapeutic cloning proved a trickier nut to crack, however, the panel being split: ten members advocated a four-year moratorium; seven voted for research with federal regulation.

Over the next fourteen months, the committee continued to 'gather information' and hold meetings with 'numerous experts' in the relevant scientific, ethical, social, advocacy and entrepreneurial arenas. The result of these consultations, *Beyond Therapy: Biotechnology and the Pursuit of Happiness*, is an extended cautionary tale that urges us to accept and glory in the imperfections of humanity.

Since then, the Council has been cranking up its output (rather like a jaded rock group with contractual obligations to fulfill). In December, it made its third release—*Being Human: Readings from the President's Council on Bioethics*. This is a 600-page set of excerpts from classical and modern literature (none of which is scientific and most of which predates molecular biology) that the Council claims epitomizes the experience that puts the uniquely human into the beings that we are.

If *Being Human* was the set of reworked 'standards' (to extend the rock music analogy), then the latest report, *Monitoring Stem Cell Research*, represents the Council's 'Greatest Hits.' Now with a somewhat revised lineup—after the undignified removal of Elizabeth Blackburn in

February—the Council has returned to its favorite theme. Unsurprisingly, in this latest review of stem cell technology, there is nothing new to say. Why? Because the council itself—via the restrictions it has fostered—has put the stops on the very research processes that might have shed new light on the subject.

Clearly, the record needs to be changed. But Kass and his sympathizers appear unwilling to consider any advance in stem cell technology or cloning research, regardless of the capacity of ethical bodies in other countries to come up with workable solutions that provide reasonable protections for embryos and yet allow ES cell research to proceed. As long as the President's Bioethics Council remains fixated on the scarcely perceptible and intangible threats of cloned human embryos to the fabric of American society, ES cell research in the United States is in clear and present danger of falling far behind the rest of the world.

Our interest in computation

One day, gene expression data will be seamlessly coupled with data on protein expression, post-translational modification and activity. Systems approaches will allow us a comprehensive view of complex genetic and metabolic networks, with a complete understanding of the interplay between transcriptional, translational and post-translational mechanisms of genomic regulation. We will be predicting protein structure (and even function) from sequence information, perhaps even for multidomained/multifunctional proteins. We will have a universal vocabulary throughout biology, allowing rapid interchange of and cross talk between different types of data. But in the meantime, we have some work to do.

This month, we inaugurate a section on computational biology. The aim of the section is to present the wider biological community with advances taking place in computational analysis that will shape future research. In each issue, the section will present reviews by leading experts, step-by-step guides to online resources and statistical tools, comparisons of selected online tools or software packages, and discussions of community initiatives and computational concepts. We do not intend to publish original papers on new databases; authors of such papers are directed to the relevant issue of *Nucleic Acids Research*, which appears every January.

The use of computational techniques and mathematics in biology is nothing new; in fact, J.B.S. Haldane was working on mathematical demonstrations of evolutionary theory as far back as the early 1930s. But modeling and systems approaches are the most exciting and unifying theme in science today, promising to make biology more predictive and quantitative than ever before. We hope that the new section will help our readers along this journey.