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Cloning and Embryonic Stem Cells: a New Era in Human Biology and Medicine

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The cloning of mammals using adult cells as nuclear donors has been achieved and the same procedure can be, at least theoretically, used to clone humans. Another recent technological advance, the derivation of human embryonic stem cells, opens up new possibilities in cell and tissue replacement therapy and heralds significant improvements in gene therapy. Besides suggesting new and potentially valuable medical applications, the insights gained through the use of these techniques could significantly enrich our understanding of basic mechanisms regulating human development. On the other hand, these preliminary results are viewed by many as the opening of the Pandora's box and there are loud voices clamoring that research in these areas be forbidden in perpetuity. I suggest in the following article that at present we do not know enough to make anything but an entirely emotional decision about future applications of these techniques. I try to summarize the current state of the knowledge in the field and indicate how much further research is necessary if benefits and drawbacks are to be properly understood.

Key words: chimera; cloning, human; cloning, organism; DNA, recombinant; embryo; embryonic stem cells; genetic engineering; germ line; human cloning; molecular cloning; transfection