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Ethical concerns over use of new cloning technique in humans

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Sir

The announcement that induced pluripotent stem (iPS) cells have been used successfully to produce viable mice (X. Y. Zhao *et al.* *Nature* **461**, 86–90; 2009 and M. J. Boland *et al.* *Nature* **461**, 91–94; 2009) represents a great technical achievement. But enthusiasm should be tempered by ethical concerns over any extension of this technology to research in humans.

The mouse embryos were created by 'tetraploid complementation', in which mouse iPS cells (produced from fibroblasts) are injected into a tetraploid blastocyst to allow them to express their developmental potential fully. As the authors point out, this technology provides a demonstration of true pluripotency/totipotency and usefully offers a stringent test of iPS-cell quality. Both groups also indirectly consider the wider application to human cells in suggesting that fully pluripotent iPS cells could eventually be important in cell-replacement therapy and therapeutic interventions.

It is important to remember that there would be severe ethical problems associated with using tetraploid complementation technology in humans, even without the intention of implanting the resulting artificially created embryos into a uterus (see, for example, H.-W. Denker *Reprod. Biomed. Online* **19**, suppl. 1, 34–37; 2009). The issues are similar to those that have arisen over embryonic stem cells and include aspects of patentability.

At present, human reproductive cloning is banned in all countries, and therapeutic cloning is prohibited in several. But ethical standards may differ and/or change in the near future. The implications should be borne in mind by researchers everywhere in their impulse to follow up any application of tetraploid complementation technology with human iPS cells.