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Mr Elton Humphrey
Secretary
Senate Community Affairs Committee
Parliament House
Canberra, ACT 2600

Dear Mr Humphrey,

Legislative responses to recommendations of the Lockhart Review

I am writing to follow up some issues raised by Senators Patterson, Stott Despoja and Webber when I was witness at the Committee on 23 October 2006, in Sydney.

Senator Patterson asked me about animal evidence for the use of therapeutically cloned stem cells in transplantation studies in Parkinson's disease. I thank the Senator for reminding me of the article by Barberi et al (2003)[1].

The issue under discussion was the lack of evidence for the immunogenicity of therapeutically cloned cells because of the mitochondrial genes passed down from the egg donor. The mitochondrial proteins produced from these genes can potentially make the resulting stem cells and their progeny immunogenic when transplanted into a host animal that was the donor of the nucleus of the therapeutically cloned stem cells, as could occur in the use of therapeutically cloned stem cells in human clinical applications. The animal test of this would be to transplant therapeutically cloned stem cells, or their progeny, into the donor of the nucleus, ensuring that the donor of the egg came from a different strain of mouse to the donor. If the donor of the egg and the mother of the donor of the nucleus came from the same inbred mouse strain their mitochondrial DNA would be the same and the transplantation experiment would not mimic what would occur in human clinical applications of therapeutic cloning.

In the study of Barberi therapeutically cloned stem cell progeny (ntES cell line) were transplanted into the parkinsonian mouse and were therapeutic but the mouse strain of the egg donor of the therapeutically cloned cells is not stated. The strain of the parkinsonian hosts is stated (129SvJ). The strain of the ntES cell line is not stated. It was obtained from others whose publication reported on several ntES cell lines, some of which were 129Sv (Wakayama et al, 2001)[2]. Barberi's study was a test of the therapeutic potential of ntES cells and not a specific test of immunogenicity of donor egg mitochondrial proteins.

[1] Barberi et al (2003) Nature Biotechnology, 21:1200-1207
[2] Wakayama et al (2001) Science, 292:740-743

Senator Patterson raised another study by "Ridder" that I have been unable to identify from the context of the question. A paper by "Rideout" et al (2002)[3] used ntES cells in a mouse model of immunodeficiency but these experiments were done with the egg donor and nucleus donor mother of the same strain.

Senator Webber raised a study by Chang. I found a paper by Chang et al (2006)[4] in which embryonic stem cells were used to correct the sickle cell mutation. These experiments were all in vitro and transplantation of the ntES derived cells was not attempted.

By my reading of the literature, it is still unknown whether therapeutically cloned cells are immunogenic to the nucleus donor.

Yours sincerely,

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[3] Rideout et al (2002) Cell, 109:17-27

[4] Chang et al (2006) PNAS, 103:1036-1040