

An Ethical Assessment of Obtaining and Using Human Embryonic Stem Cells

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1. ETHICAL CRITERIA

1.1 Every member of the human family has, according to international law, fundamental human rights arising from his or her inherent dignity. Among these fundamental human rights, which are described as inviolable and inalienable, is the right to life.

1.2 Fundamental human rights apply to the unborn as well as to the born. Thus in international law a pregnant woman cannot be the subject of capital punishment.

“That international law does envisage human rights protection for the unborn can be seen in the provision dealing with capital punishment in the *International Covenant on Civil and Political Rights 1966*:

“Sentence of death shall not be imposed for crimes committed by persons *below eighteen years of age and shall not be carried out on pregnant women.*¹ (Emphasis added)

“In this provision, a state may execute a woman only when she is not pregnant. The innocent are not to die along with the guilty.² Indeed the *travaux préparatoires* of the

¹ Article 6(5) of the *International Covenant on Civil and Political Rights 1966*, G.A. res. 2200A (XXI). 21 U.N. GAOR Supp. (No. 16) at 52. U.N. Doc. A/6316 (1966), 999 U.N.T.S. 171. See also the United Nations *Safeguard Guaranteeing Protection of the Rights of Those Facing the Death Penalty 1984*, Article 3.

² Marc J. Bossuyt in the *Guide to the “Travaux Préparatoires” of the International Covenant on Civil and Political Rights*, (Martinus Nijhoff Publishers, 1987) observes:

Commission on Human Rights, 5th Session (1949), 6th Session (1950), 8th Session (1952) A/2929, Chapt. VI, §10: “It would seem that the intention of paragraph 4 [5] which was inspired by humanitarian considerations and by consideration for the interests of the unborn child, was that the death sentence, if it concerned a pregnant woman, should not be carried out

International Covenant on Civil and Political Rights 1966 makes this abundantly clear:

“The principal reason for providing in paragraph 4 [now Article 6(5)] of the original text that the death sentence should not be carried out on pregnant women was to save the life of an innocent unborn child.³

“Here is an explicit recognition in international law that human rights enjoyed by every member of the human family includes the unborn. This fundamentally humane principle was reflected in the common law in England and Australia when each country had the death penalty.^{4,5}

1.3 Every member of the human family is to be counted as a person, philosophical opinions on personhood notwithstanding.⁶

1.4 A member of the human family exists from the time when the sperm first penetrates the egg.⁷

at all. It was pointed out, however, that the provision, in its present formulation, might be interpreted as applying solely to the period preceding childbirth [*E CN.4 SR.811.p7(B)*].”
Third Committee, 12th Session (1957)

A/3764, §118 (actually §117): “There was some discussion regarding the meaning of paragraph 4 [5] of the draft of the Commission on Human Rights (E/2573, annex IB), which provided that the sentence of death should not be carried out on a pregnant woman. A number of representatives were of the opinion that the clause sought to prevent the carrying out of the sentence of death before the child was born [*A/C.3/SR.809, §27 (CHI); A/C.3/SR.810, §2(B), §7(IR); A/C.3/SR.812, §32(RI); A/C.3/SR.814, §42(CDN)*].

However, other (sic) thought that the death sentence should not be carried out at all if it concerned a pregnant woman [*A/C.3/SR.810, §14(PE); A/C.3/SR.811, §24(SA)*]. The normal development of the unborn child might be affected if the mother were to live in constant fear that, after the birth of her child, the death sentence would be carried out.”

³ *Ibid.*, §118, A/3764.

⁴ In *R v. Wycherley* 173 ER 486 the accused woman had been found guilty of murder and was sentenced to death. When asked whether she had anything to stay the execution she replied: “I am with child now.” A jury was empanelled and found that the woman was *not* pregnant. Nevertheless, the case highlights that the death penalty was stayed pending the resolution of the issue and logically would have been stayed until at least the birth had she been found to be pregnant.

⁵ Fleming, John I & Hains, Michael G, “What Rights If Any Do The Unborn Have Under International Law?”, *Australian Bar Review*, **16**:195, 1997

⁶ *Universal Declaration of Human Rights*, Article 6 and cf *International Covenant on Civil and Political Rights*, Article 16

⁷ T.W. Sadler, *Langman’s Medical Embryology Sixth Edition*, (Baltimore: Williams & Wilkins, 1990), 30; W.J. Hamilton and H.W. Mossman, *Human Embryology 4th Edition*, (Cambridge: Plenum, 1972); L.B. Arey, *Developmental Anatomy 7th Edition*, (Philadelphia: Saunders, 1975); B. Alberts et al, *Molecular Biology of the Cell*, (New York: Garland, 1983); K.L. Moore, *Before We Are Born*, (Philadelphia: Saunders, 1983); L. Nilsson et al. *A Child is Born*, (London: Faber & Faber, 1977); R. Yanagimachi, “Mammalian fertilization”, *The Physiology of Reproduction*, eds. E. Knobil, J. Neill et al, (New York: Raven Press, 1988), 135.

1.5 The integrity of the human being cannot be violated in the interests of science or society, nor is the human being to be discriminated against on the basis of his or her maturity, abilities, or any other factor.⁸

1.6 No procedure, treatment or experiment may be carried out on a human being that is not in the best interests of that human being or which will violate that human being's fundamental human rights, especially the right to life.⁹

2. WHAT ARE EMBRYONIC STEM CELLS?

2.1 The term 'stem cell' refers to a precursor cell which has the capacity to develop (differentiate) into more specialised cells. In the adult, stem cells can be found in bone marrow, skin, brain, gonads and other tissues, and give rise to more specialised cells upon demand. 'Embryonic' or 'embryonal' stem cells refer to cells in the earliest stages of development. These may be the cells of the inner cell mass of the blastocyst or specific primordial germ cells located in the early embryo that eventually become sperm and oocytes. Recently, human embryonic stem (ES) cells have been isolated from these two sites and maintained in culture to produce self-replicating cell lines using established cell culture techniques.^{10 11}

2.2 Cells may be 'pluripotent' in which case they are able to give rise to a limited number of more specialised cells, or 'totipotent', in which differentiation into all cell types is possible (approximately 200 different types of cells in the human body). There is an important lack of clarity in the use of the term 'totipotent'. The term can also be used to imply the potential to develop into an embryo, fetus and child. On this definition it is unlikely that ES cells alone would possess this capability.

⁸ Cf *Universal Declaration of Human Rights*, Article 2

⁹ Cf *Universal Declaration of Human Rights*, Article 30

¹⁰ Thompson, J.A. *et al*, Embryonic stem cell lines derived from human blastocysts. *Science* **282**: 1145-1147, 1998

¹¹ Shambloott, M.J. *et al*. Derivation of pluripotent stem cells from cultured human primordial germ cells. *Proc. Natl. Acad. Sci. USA* **95**: 13726-31, 1998

3. ES CELLS AND CLONING ANIMALS

3.1 However, in animals, ES cells injected into a blastocyst develop alongside the existing cells of the inner cell mass and derivatives appear in all embryonic cell lineages.¹² Alternatively, ES cells can be transplanted into tetraploid host blastocysts which go on to form an embryo as the host cells die.¹³ If these two techniques could be applied to humans taken to term, the resulting child would be primarily, if not completely, biologically a product of the transplanted ES cells. Although the nature of the genome may be uncertain, a culture dish of human ES cells could theoretically produce any number of ‘clones’.

3.2 ‘Tetraploidy’ refers to a major chromosomal aberration where there are “two complete extra sets of chromosomes present”. This is a condition “not generally compatible with survival.”¹⁴ Such a blastocyst is, nevertheless, a developing embryo even though its continuing survival is extremely limited. The use of tetraploid blastocysts where humans are concerned raises familiar fundamental ethical issues about the intentional creation of human beings with defects as well as the use, for the benefit of science and society, of so-called ‘defective embryos’ as disposable products.

4. USING STEM CELLS THERAPEUTICALLY

4.1 Stem cells possess certain therapeutic potential including the ‘manufacture’ of various tissues and perhaps organs. The manufacture of organs outside of the human body depends upon solving the unimaginable complexities involved in growing such intricate three-dimensional living structures, let alone keeping them alive.¹⁵ Some may even regard current talk of such ‘possibilities’ as exercises in ‘science fiction’. While the cues for differentiation of stem cells into different tissue types are poorly understood, nevertheless these cells often differentiate spontaneously into a variety of

¹² Solter, D. & Gearhart J., Putting Stem Cells to Work. *Science* 5 March 1999, **283**: 1468-1470

¹³ Nagy, A. *et al.* Derivation of Completely Cell Culture-Derived Mice from Early Passage Embryonic Stem Cells. *Proc. Natl. Acad. Sci. USA* **90**:8424-8428, 1993.

¹⁴ Mastroianni, L. *et al.*, *Reproductive Physiology Volume 1*, Casterton Hall, Carnforth, Lancs., The Parthenon Publishing Group. 1990. 98

¹⁵ *Scientific, Ethical and Regulatory Considerations in Pursuit of Cloning Human Beings.*, Australian Health Ethics Committee, NH&MRC, Draft, November 1998, Chapt. 3, 27.

tissues. Some work has achieved limited control over the process of specialisation, with the hope that, as various factors are isolated, more will be understood.

4.2 *Although most of the current interest for these ‘therapeutic’ uses centres on ES cells, the manipulation of stem cells from adult tissue (not ES cells) has shown considerable promise, with these cells displaying unexpected versatility.¹⁶ While the ethical issues associated with obtaining stem cells from non-embryonic tissue are not problematic, nevertheless the ethical issues involved in the uses to which these cells may be put are the same as those for ES cells.*

5. ‘REPRODUCTIVE’ & ‘THERAPEUTIC’ CLONING – AN OBFUSCATION

5.1 Attempts have been made to clarify the debate on cloning by differentiating between ‘reproductive’ cloning and ‘therapeutic’ cloning.¹⁷ The former refers to production of a clone by, for example, nuclear transfer, followed by development to term. The latter refers to the same process, but is limited by harvesting ES cells from the developing blastocyst. The ES cells would then be put to therapeutic use, and the blastocyst destroyed in the process. This amounts to terminating the developing human being (clone) that would otherwise be born. The assumption here is that embryos up to 14 days after fertilisation are not really embryos. They are ‘pre-embryos’, non-persons without moral significance. Accordingly they may be disposed of at will, the purpose for which they were made (the provision of stem cells) having been fulfilled. Here, scientific nomenclature, arbitrarily assigned, serves only to obfuscate the scientific and moral reality of embryonic human beings who will be used and discarded.¹⁸ Once the principle of cloning human beings has been

¹⁶ Vogel, G. Harnessing the Power of Stem Cells, *Science*, 5 March 1999, **283**:1432-1434.

¹⁷ A Position Statement, *Australian Academy of Science*, 4 February 1999.

¹⁸ It is interesting to note that Langman’s *Medical Embryology* Sixth Edition does not use the term “pre-embryo”, a term which is meant to refer to the entity up to 14 days. The comparative lawyer Albin Eser has suggested that “the naïve (speaking from a normative-theoretical perspective) and rather simplistic efforts to get rid of the basic value problem through terminological ‘degradation’ of the pre-implantation embryo to the status of ‘pre-embryo’ or even to simple ‘seed’ or ‘germ’ should be abandoned. Rather than prejudicing the value questions involved through conceptual-terminological game-playing it would be better to concentrate on the question that is lastly decisive: To what extent does or should a species-specific human (since originating from human gametes) new entity of life – i.e., at least genetically capable of achieving the full potential of a human being – possess sufficient

surrendered, and especially when the fate of those clones is determined by the ‘therapeutic’ benefit to others, and since the line of protection of human embryos would have been arbitrarily set at 14 days, then there is really no reason why fetuses could not be used for the same sorts of ‘therapeutic’ purposes up to birth.

5.2 To obtain the maximum therapeutic benefit, a clone would be made from the nuclear transfer of somatic cells from the individual who would benefit from the ES-cell derived tissue or organ transplant which would occur. One would therefore be cloning oneself for direct therapeutic benefit with the intention to terminate the clone, albeit at a very early stage. If the ES cell technology was slow to produce complete organs *in vitro*, but the cloning techniques were perfected, it might be easier to allow the clone to develop further until organs had already formed, before harvesting. The therapeutic imperative for hard cases (not to speak of the scientific imperative which demands anything to be done that can be done for the sake of ‘science’ itself) may well create the pressure and the strong incentive to bring clones to near term before terminating the pregnancy to harvest the desired immunologically compatible organs and tissue. And since, as has been argued in the previous paragraph, the essential principles would already have been surrendered, scientific and therapeutic expediency will continue to determine where the lines are to be drawn. In any case, such a scenario is not fanciful in light of the way in which the method of abortion was varied to procure live 10 week-old fetuses, so that fresh brain cells could be gathered to be used in the treatment of patients with Parkinson’s Disease. In these cases vacuum aspiration was abandoned in favour of forced dilation of the women involved followed by the delivery of life, intact fetuses whose heads were sliced off prior to gathering the desired brain cells.

5.3 Embryoid bodies refer to structures which are similar to embryos but lack the ability to develop fully. They are derived parthenogenetically¹⁹ from gonadal

value to make us unwilling to allow for total freedom of choice with respect to maintaining or destroying this life?” A. Eser, “Experiments with embryos: legal aspects in comparative perspective”, UK National Committee of Comparative Law 1987 Colloquium Legal Regulation of Reproductive Medicine (Cambridge) cited in Anthony Fisher, *IVF The Critical Issues*, (Melbourne: Collins Dove, 1989), 173-174.

¹⁹ Some parthenotes can produce viable embryos. However, Yanagimachi’s nuclear transfers from neurons or male Sertoli cells to enucleated oocytes produced so-called embryoid bodies rather than viable embryos. In this instance, the attempt at total cloning using these nuclei may be viewed as production of a defective embryo rather than something other than an embryo. In other words, were this method to be attempted in humans, a defective clone may be produced, with no real difference to a

tumours, embryomas or teratomas, and have the ability to produce ES cells. ES cells produced in this manner may avoid some of the ethical issues raised by nuclear transfer or other methods in which a viable embryo is produced. However, just what the term 'embryoid body' will be taken to mean has not yet been clarified. Thus the status of such 'embryoid bodies' is not clear and their deliberate production may amount to the intentional production of defective embryos. [Refer 2.2 above]

5.4 ES cell culture opens up the possibility for more rapid and extensive genetic screening of embryos. ES cells taken from an embryo could be subject to genetic testing with only the most desirable embryos then implanted. Currently, embryos can be subject to limited genetic testing, but if an ES cell line were cultured it would be possible to carry out far more comprehensive tests. As more becomes known about the human genome, the possibilities for eugenic manipulation expand, and the pressure to legitimise the abuse of embryonic human beings will escalate.

5.5 Stem cells from other sources have been isolated in recent years. Haematopoietic stem cells have been isolated from human bone marrow and guided into becoming red blood cells and other mature blood cells. It is not the purpose of this paper to examine the ethical issues involved in the obtaining and use of stem cells. It is sufficient to indicate that some of the 'therapeutic' purposes used to justify obtaining ES cells may be met by other means which may be ethically unproblematic.

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clone produced by nuclear transfer using female cumulus cells (the procedure used to produce Dolly). The point is that viability alone ought not to be the criterion for the moral status of a cloned individual. Hence some 'embryoid bodies' ought to be afforded the same status as viable embryos.