

Plunkett Centre for Ethics

A joint centre of Australian Catholic University, St Vincent's Health Network Sydney and Calvary Healthcare

Submission to Senate Standing Committee on Community Affairs into the Science of Mitochondrial Donation and related matters

1. In order to appreciate the ethical status of mitochondrial replacement, it is important to begin by noting two things:

- 1.1. Consideration of any human proposal involves, or should involve, attention to all the features involved in ethical evaluation. It is not enough to say that only consequences matter or that good-enough consequences can make an otherwise bad act ethically permissible. It is not enough to say that only motives matter, that good-enough motives can make an otherwise bad thing ethically permissible. Indeed, the idea that some acts are 'intrinsically evil' means *not* that they are heinously wicked but rather that they are *wrong independently of their consequences*. This point was misunderstood by the writers of both the Lockhart Report and the Heerey Report. In both reports, it was argued that sufficiently beneficial outcomes could override inherent objections.¹ That said, both reports argued against removing the prohibition on using DNA from more than two persons.
- 1.2. So-called 'mitochondrial donation' is in fact the transfer of nuclear-DNA either between human eggs (maternal spindle transfer or MST) or between human embryos (pro-nuclear transfer or PNT).² The term 'mitochondrial donation' is thus misleading.³
- 1.3. Mitochondrial replacement does not cure anyone of mitochondrial disease. It is not treatment or therapy for an existing child or adult. So, in assessing the risks mitochondrial replacement involves for those who are produced and their descendants,

¹ Report of the Independent Review of the Prohibition of Human Cloning for Reproduction Act 2002 and Research Involving Human Embryos Act 2002, Canberra, 2011; 5.3

² In MST, an egg composed of DNA from two women is fertilized by sperm. In PNT, an embryo (formed by an egg which is free of mitochondrial disease and sperm) has its nuclear material removed and replaced with nuclear material from an egg or embryo of the woman who has mitochondrial disease.

³ Baylis, F. Human nuclear genome transfer (so-called mitochondrial replacement): clearing the underbrush. *Bioethics*, 31(1), 2017

it is important to start by noting that **these risks are unnecessary**. There are other ways in which women with mitochondrial disease may avoid passing on mitochondrial conditions (by avoiding having children or by using less risky methods).

2. Mitochondrial replacement is ethically problematic for the following reasons:

- 2.1. In destroying human embryos, either at point of use (as in pro-nuclear transfer) or through prior embryo experimentation (as in both methods), mitochondrial replacement violates the **respect owed to embryonic human life**. Treating an embryo merely as a *means* and not also as an *end in itself* violates the respect owed to embryonic human life.⁴
- 2.2. In common with the other techniques of artificial reproductive technology, mitochondrial replacement exchanges **procreation** with **manufacture**.⁵ In addition pro-nuclear transfer involves **reproductive cloning**: in PNT an embryo with faulty mitochondria and one without are combined and destroyed to produce a third embryo. Though a child born as a result of MST may be said to have ‘three genetic parents’, a child born as a result of PNT may be said to have ‘genetic ancestry’ but not ‘genetic parents’.
- 2.3. Any procedure for the creation of a child should be consistent with the child’s right to a natural biological heritage.⁶ Mitochondrial replacement **violates** the child’s right to a natural biological heritage, that is, the right to be conceived from untampered-with biological origins, in particular, a right to be conceived from a natural sperm from one, identified, living, adult man and a natural ovum from one, identified, living, adult woman. Mitochondrial replacement ‘fragments’ motherhood: a child born of this technique inherits genetic material from a man and two women.⁷ Adoption has long given rise to

⁴ Congregation for the Doctrine of the Faith. *Donum Vitae: Instructions on respect for human life in its origins and on the dignity of procreation*, 1987.

⁵ *Donum Vitae*, *ibid.* In 2005, the United Nations called on all members states to ‘prohibit all forms of human cloning inasmuch as they are incompatible with human dignity and the protection of human life’. Supporters of human cloning held that ‘inasmuch as’ means ‘to the extent that’. However, the ordinary meaning of the phrase is ‘because’. *UN Declaration on Human Cloning*, 2005.

⁶ Somerville, M. Children’s Human Rights to Natural Biological Origins and Family Structure, *International Journal of the Jurisprudence of the Family*, Vol 1, 2010.

⁷ Enthusiasts for legalizing the technique often downplay the significance of the contribution of the woman who provides the mitochondrial DNA. Even if the genetic contribution is numerically small, it is nonetheless crucial: if the technique is successful it will be this part of the DNA which

concerns about the child's right to knowledge of his or her biological heritage. However, in the context of assisted reproductive and genetic technologies, the clarification and restatement of that right has become more significant.⁸

2.4. Mitochondrial replacement is a **risky** way of enabling a small number of women who wish to have children to whom they are genetically related, to avoid passing on mitochondrial disease.⁹ Risks exist for the intending mother, the ova donor, a gestational surrogate (if one is used), the embryo, and the children he or she may have after reaching adulthood. Arguably, however, the greatest health risks will be faced by the children who begin life as embryos modified in this way and by their descendants.¹⁰ For this reason, mitochondrial replacement arguably violates the duty of parents not to subject their children to undue risks. It also raises extraordinarily difficult challenges to the principles of 'informed consent' (the principle that, except in cases of emergency treatment, physical treatments should not be administered to any competent person until all relevant information has been discussed and considered and the person's free and adequately informed consent has been given) and 'anticipatory consent' (the principle that, if we cannot reasonably assume that someone - for example, the 'to be

will lead to a child free from mitochondrial disease. Hens et al, reporting a study of professionals' views on the use of mitochondrial replacement, that the contribution of egg providers was as area of debate amongst their interviewees, and that 'the status of the donor of the mitochondria may evolve as more become known about the role of mtDNA'. Hens, K. Dondorp, W. de Wert, G. A leap of faith? An interview study with professionals on the use of mitochondrial replacement to avoid transfer of mitochondrial diseases. *Human Reproduction*, doi: 10.14093/humrep/dev056 (in press); as cited in Haimes, E & Taylor K. Rendered Invisible? The absent presence of egg providers in U.K. debates on the acceptability of research and therapy for mitochondrial disease. *Monash Bioethics Review*, 33, 2015; 360-378

⁸ Tobin, B. Donor-conceived people: are they entitled to identifying information about their biological parents? *Bioethics Outlook*, 24 (1), 2013.

⁹ Although proof of safety is, by definition, impossible in this situation, the evidence so far is far from reassuring. Most of the work has been done on early-stage embryos; basic research on epigenetic and other interactions among nuclear and mitochondrial genes is lacking; animal studies are preliminary. HFEA first required that the techniques be tested on animals, and then dropped that requirement - after US researchers found the technique to be unsuccessful in macaques. Darnovsky, M. A slippery slope to human germline modification, *Nature*, Vol 499, July 2013.

¹⁰ In this regard, there are four categories of concern regarding the embryo: (i) epigenetic harm caused by nuclear transfer, (ii) mitonuclear mismatch, (iii) other effects that mitochondria may have on the developing embryo, and (iv) the carry-over of mutated mtDNA. Lee, K. Ethical implications of permitting mitochondrial replacement, *National Catholic Bioethics Quarterly*, Vol 16 (4), 2016; 619-632

Plunkett Centre for Ethics

born child' - affected by our decision, who is not present, would consent if present, it is not ethical to proceed¹¹).

- 2.5. In modifying the germline, mitochondrial replacement represents the '**opening of the door**' to eugenic germ-line genetic manipulation. It is presented in a way which suggests that its use will be restricted to eradicating disease, that it will be controlled and regulated to a small defined population. In fact, it offers a technique by which (a) lesbian couples could have a child who is genetically related to both parties (one contributing the nuclear DNA, the other contributing the mitochondrial DNA), and (b) older women with lower levels of fertility might improve their chances of having a child.¹² Thus it constitutes one more step in an increasingly-permissive Australian regulatory regime which began with the removal of the prohibition on research which involves the destruction of human embryos and allowed their creation for (destructive) human research.

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¹¹ Somerville, M. op cit.

¹²Smyth, C. Allow three-parent IVF to help older women too, says pioneer. *The [London] Times*, 9 February, 2015. As cited in Dimond, R & Stephens, N. Three person, three genetic contributors, three parents: mitochondrial donation, genetic parenting and the immutable grammar of the 'three x x'. *Health*, Vol 22 (3), 2018, 240-258,