Freedom, law, politics, genes: the case of mitochondrial transfer

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In early 2015, the UK became the first country to make explicit legal provision for the use of mitochondrial transfer techniques leading to a live human birth. Mitochondrial transfer offers a means to prevent mitochondrial illnesses being passed from a mother to her children, as they would be inevitably without the process. Two methods are possible: maternal spindle transfer, and pronuclear transfer. In both, nuclear material is removed from a cell that has faulty mitochondria, and inserted into an enucleated cell with healthy mitochondria; the difference boils down to one of whether that nuclear material is taken from an unfertilised or fertilised ovum. In this chapter, I shall examine some of the senses in which mitochondrial transfer, and the law's handling of it, might be taken to relate to scientific freedom. I shall try to avoid taking a position; my concern is simply to look at some of the potential argumentative fault lines. For the sake of ease, I shall conflate the terms 'maternal spindle transfer' and 'pronuclear transfer' under the term 'mtDNA transfer'.

The purported advantages of mtDNA transfer are easily explained. Mitochondria are mainly concerned with energy production within the cell, and so any faults in them lead to the cell as a whole not functioning as it ought. This malfunction can manifest as any of a range of conditions – some mild, some serious, some fatal – and the term 'mitochondrial disease' is a basket term that captures this range (Tuppen 2010). These conditions may present differently throughout a person's life. The ability to 'edit' a person's mitochondrial inheritance at the very earliest stages of life, or even prior to their life beginning, provides an opportunity to improve what might otherwise be a significantly diminished quality of life. (For the sake of what follows, I shall leave to one side the debates surrounding the non-identity problem: there is so little mtDNA compared to nuclear DNA within a cell that I shall assume that mtDNA transfer alters a determinate person's life, not the person who lives it. If I am wrong on this, and the identity of the child born changes according to whether or not mtDNA transfer has been used, it would mean that no child is 'treated' by the

technique, so much as replaced by an overwhelmingly similar sibling; but for the sake of my argument here, I think the point would be nugatory) (Wrigley et al. 2015; Liao 2017; Rulli 2017).)

In short, mtDNA transfer is a form of genetic engineering that promises to make future lives appreciably better. Moreover, because mitochondria are inherited directly down the maternal line, the ability also means that mitochondrial faults that might otherwise pass down the generations can be prevented in subsequent generations. As we shall see, this does raise a couple of lines of concern with respect of the ethics of mtDNA transfer.

Freedom from legal restriction

The background to the UK's regulation of mtDNA transfer goes back to the Human Fertilisation and Embryology Act (1990), which was modified by a further Act in 2008; in effect, the mtDNA transfer regulations constitute a gloss on that modificatory legislation.

The 1990 law's attitude to genetic manipulation was fairly straightforward: it stipulated in section 3(1) that '[n]o person shall bring about the creation of an embryo except in pursuance of a licence', and in section 3(2) it stipulated that '[n]o person shall place in a woman (a) a live embryo other than a human embryo, or (b) any live gametes other than human gametes' (where, *per* section 1(1)(b), 'embryo' was taken to include 'an egg in the process of fertilisation'). On the face of it, this would have permitted mtDNA transfer, since embryos manipulated in this way are clearly human embryos. However, section 3(3)(d) said that a licence to bring about the creation of an embryo could not authorise 'replacing a nucleus of a cell of an embryo with a nucleus taken from a cell of any person, embryo or subsequent development of an embryo'. No reference was made to the purpose for which nuclear material may be replaced. mtDNA transfer involves the nuclear matter from one cell being implanted into an enucleated second cell. Therefore section 3(2) would have been moot: there is no need to worry about permitting the implantation of a cell the creation of which is not permitted.

Yet there could be situations in which we would want to replace a cell nucleus for reasons other than reproduction – say, as part of a research programme; the 2008 Act modified the law such as to allow such manipulations. Subsection 3(3)(d) was to be deleted, and subsection 3(2) changed to specify that only 'permitted' embryos could be implanted in a woman. Section 3(5) of the 2008 Act added to the 1990 Act a new section, 3ZA, to follow section 3. This new section defined 'permitted' embryos as being those created in the fertilisation of a permitted egg by permitted sperm – in turn, defined as eggs and sperm the nuclear or mitochondrial DNA of which has not been altered – and that had itself undergone neither alteration of its own nuclear or mitochondrial DNA, or had any cells added to it except by regular cell division. Thus nuclear matter could be transferred from one embryo to another, so long as the process did not result in gestation.

Importantly, though, section 3ZA(5) made one exception to this rule: regulations may provide that

- an egg can be a permitted egg, or
- an embryo can be a permitted embryo, even though the egg or embryo has had applied to it in prescribed circumstances a prescribed process designed to prevent the transmission of serious mitochondrial disease.

In other words, the door was left open to permission being given for mitochondrial transfer techniques to be used for the sake of avoiding mitochondrial disease. What happened in 2015 was simply that a regulation was approved that provided for, and set out the conditions of, this eventuality (Human Fertilisation and Embryology (Mitochondrial Donation) Regulation 2015).

Though the UK's regulations on what can be done to embryos remain fairly tight – no other form of genetic engineering that would generate an embryo to be implanted is currently permitted – there is a freedom granted by the prevailing regulations in the UK that did not exist before, and that does not exist in a number of other countries (Hamzelou 2016).¹

This legislative liberalisation has not been without controversy. Two significant lines of objection are worth mentioning. The first is that the technique may be unsafe, and that freeing us to pursue it may not be desirable for welfarist reasons. The second is a version of the slippery slope argument – that there are some freedoms that we ought not to countenance, and that genetic modification of humans may be one of them. Such a line of argument need not appeal to the welfare of particular people. I shall suggest that both these lines fail. On the other side of the debate, there is a question about whether pursuing such technologies may be freedom-enhancing, therefore not only the kind of thing that liberal states should tolerate, but the kind of thing that they ought to endorse. This line of argument is not without its own complexities, as we shall see.

Freedom from risk

The safety concern is straightforward: that genetic engineering is, in the grand scheme of things, a very young science, and that such is the import of our genomes to our well-being that we cannot be certain that we would not be generating much bigger problems than we were hoping to solve. Faulty mitochondria are passed down maternally, to all of any affected woman's children; they cannot be passed on to her grandchildren if she has no daughters. By the same token, should interference with natural mtDNA inheritance unexpectedly create its own problems, we might expect them to be passed down matrilineally as well. We may be condemning not just one person, but an indefinite number of persons over the subsequent generations, to suffer the consequences of a misguided intervention.

Concerns along these lines were important factors in the debates on the regulations in the House of Commons in 2014 and 2015. Some MPs made a case for a precautionary approach to mtDNA transfer, which would presumably mean deferring the new licences – perhaps indefinitely. The fact that the alterations would be heritable was a cause for concern for others; thus Robert Ffello MP pointed out that ‘the research that has been done talks about generations of mice or of monkeys, but that does not address the fact that until there have been three, four, five or 10 generations, we will not know what the long-term effects are’ (Ffello 2014).

The safety of an action is a legitimate factor in decisions about whether to perform or allow it. The moral gravity of the freedom to make use of mtDNA transfer techniques does depend fairly straightforwardly on how safe they are. If we are Millian by inclination, a version of the harm principle would suffice to carry this argument: if there is nothing improper about curtailing someone’s liberty to prevent harm to others (Mill 1985; Ellison 2015), there is presumably also nothing improper about not granting that liberty to prevent harm to others who may not exist yet, but the quality of whose existence will be influenced by the activity in question. If we are non-Millian utilitarians, without the same overriding concern to preserve liberty whenever possible, the justification of the action will depend much more straightforwardly on the expected welfare return – and the higher the risk of diminished welfare, the weaker the justification. For non-consequentialists, it is likely still to be possible to construct an argument along the lines that a virtuous or dutiful person would be wary of passing a law that permits something with a significant risk of harm, even if an appeal to harm is not the main philosophical driver. Whatever our moral position, the greater the risk of harm, the weaker the justification for making the regulations more permissive. It is not unreasonable to think that one of the primary duties of the state is to afford as much protection as possible to citizens and future citizens from risks that they might otherwise face.

Speaking in the 2015 Commons debate, Jane Ellison MP attempted to answer these concerns, drawing MPs’ attention to the fact that

[t]here has been much discussion of the safety of mitochondrial donation techniques. As I have said, three reports have been produced by the HFEA-convened expert panel during the current Parliament. On each occasion, the panel has concluded that there is nothing to indicate that the two donation techniques are unsafe. Although the panel has recommended that further experiments should be conducted, it expects such research to support the conclusions that it has reached so far. (2015)

This kind of statement is probably not enough to satisfy the precautionary critic of mtDNA transfer techniques. Finding nothing to indicate that the they are unsafe is compatible with not having done any research on the matter at all: that, too, would allow us to say that there is no indication of any danger. Of course, that point is hyperbolic; but the point would

remain that even when research has been done, the absence of evidence of danger is not evidence of absence. In this light, the critic is likely to see the claim that a panel expects future results to support current conclusions as scant reassurance when the unexpected results may be catastrophic, and persist for several generations. It's the unexpected consequences that should worry us most, they will argue – and sensibly. The case for liberalising the regulations is not hereby successfully defended.

Yet the thing that is missed by the precautionary account is not so much that mtDNA transfer is risky, but that there is also a risk in *not* pursuing it. It is worth repeating that mitochondria are inherited directly down the maternal line, which means that a woman who is a carrier of faulty DNA will pass it on to any offspring she has; if she has daughters, they will pass it on to their children. Therefore, the decision to be taken is not one between a risky biotechnological procedure and nothing; it's between what I shall allow for the sake of the argument is a risky biotechnological procedure, and a risky natural conception. The precautionary argument against liberalising the regulations is weakened when we consider that the counterfactual is not necessarily risk-minimising. Indeed, while it is true that the absence of evidence for harm is not evidence of absence, we have a pretty good reason to think that *not* pursuing mtDNA transfer is at best risk-stabilising; and, given that the choice is between keeping the risk level stable and intervening in a way that we believe will reduce it, there would seem to be a good moral argument available in favour of the procedure. Taking this line allows the supporter of liberalisation to turn the claim about the role of the state in protecting citizens from risk on its head.

The question then becomes one not so much of whether we should liberalise the regulations, as about what a reasonable level of certainty concerning the safety of the procedure is. Yet how we should establish what is reasonable is a puzzle in itself, there being no obvious rubric for settling the matter. One might be tempted to appeal to an ideal of open debate, the participants in which gradually home in on the most acceptable answer. When it comes to deciding what the law should be, this kind of procedure has a certain *prima facie* democratic appeal. However, in the context of concerns about risk, the problem is that data to inform this debate may be hard to come by, even assuming that the people charged with the task of framing the laws go about the task disinterestedly. Until mtDNA transfer is performed in a statistically significant number of humans, we won't be able to say a great deal with certainty about how it's likely to affect them; and even the course of the mitochondrial diseases we are aiming to prevent isn't always predictable. Nevertheless, a precautionist position is still quite weak if all it does is insist that there might be some undesirable outcome that is worse than doing nothing: it's true that more or less anything *might* happen, but it doesn't follow that we need to lose sleep over every logically possible sequela. What is needed is a plausible account of what the undesirable

consequences might be, or even just the mechanism by which they'll arise. Absent that, there is no obvious reason to take it all that seriously.

Freedom from restraint

The second line of argument turns on the claim that mtDNA transfer amounts to human genetic engineering – which, inasmuch as that it involves deliberately manipulating an aspect of the human genome for a specific purpose, is accurate. Once we have accepted the principle of human genetic engineering, is there any clear reason not to accept it in any and all other circumstances? For sure, implanting a genetically altered embryo to avoid mitochondrial disease requires a specific legal provision; but it is easy enough to make provision for more or less anything, and the mtDNA provision is important because it appears to break the back of the principled prohibition on human genetic engineering. From a certain perspective, there is little difference between adding desirable genes to a zygote or embryo by mtDNA transfer and adding other desirable genes by other methods.

The spectre of eugenics haunts the debate at this juncture, and the word has been used to describe mitochondrial transfer in the media (Newman 2013). On the face of it, there may be a decent reason for this. A short book published in 1929 by Leonard Darwin explains what he means by the term: eugenics, for him, promises 'wonderful effects' for the human race, with the object of 'improv[ing] the breed of the whole nation' (1929: 26). In particular, Darwin states that

[w]e can at all events assert that there are many kinds of men that we do not want. These include the criminal, the insane, the imbecile, the feeble in mind, the diseased at birth, the deformed, the deaf, the blind, etc., etc. . . . When eugenics comes to be more studied, it will be possible to give advice with greater confidence than at present . . . Even with our present knowledge it is, however, unquestionable that great benefits might be conferred on future generations by the voluntary renunciation of parenthood by the diseased and by such as are very likely to be the carriers of the hidden seeds of disease. (1929: 25, 33)

It takes little imagination to identify faulty mitochondria as one of the hidden seeds of disease, and women with faulty mitochondria as carriers.

Renunciation of parenthood has always been an option for people identified as carriers of congenital illness; in 2009, while considering mitochondrial illness and possible responses to being a carrier, Ruth Chadwick (2009) observed that '[o]ne option is to avoid reproduction altogether, where the risk is perceived to be too great; another is to decide to proceed nevertheless'. mtDNA transfer provides a third option. However, the general thrust remains the same: what is under consideration is a set of methods by which we can avoid bringing to birth individuals who belong to one of the 'many kinds

of men that we do not want'. In short, it seems as though mtDNA transfer can be characterised as eugenic. Darwin's criteria for desirability may strike us as odd or naive – though he is reluctant to set out precise standards that we ought to try to meet in our eugenic programmes, he still feels confident to say that '[t]he most practical way of judging grown men is by seeing how they are fulfilling the duties of the positions which they actually hold' (1929: 26) – but we can still say that there are certain inherited characteristics that it is better to be without by any reasonable standard of judgement (Brassington 2013: ch. 1), and all this could be fed into what looks like a eugenicist account or norm. Yet eugenics is the kind of thing that attracts a great deal of moral suspicion from many quarters. Would liberalisation of the law on mitochondrial transfer perhaps represent the preamble a eugenicists' charter? This may be a freedom that we ought not to grant.

I think that this is a worry that can be answered, though we have to untangle its elements. Let's allow for the moment that we are right to look at eugenics with suspicion. Even so, though some action may be the kind of thing that a eugenicist would endorse, it does not follow that everyone who endorses it is a eugenicist. It might be that mtDNA transfer is eugenicist; but the fact that we can construct a eugenicist argument in favour of it won't show that: we'd need to be able to show that there could be no non-eugenicist argument for it.

Admittedly, though, if eugenics is about improving the stock of humanity, then it may be that there really is no argument for mtDNA transfer that is not eugenicist; the reason to pursue it I outlined above rests on some sense of improving the stock of humanity, by doing what we can to eliminate an inherited illness. But if that is all there is to eugenics, there seems little to worry about. Reducing morbidity for future generations is a laudable thing; the puzzle then would be why eugenics is treated with suspicion at all.

Of course, the disastrous history of the mid-twentieth century provides us with a candidate answer to that. Eugenics as a programme has become contaminated by close association with racism and racists, and with systematic attempts to eliminate whole classes of people in the name of 'racial hygiene'; a recent article in *New Scientist* talks about sterilisation and genocide as 'the dark reality of eugenics', as though its moral aspect is a given (Bowler 2016). We should be wary of anything that might open the doors to this kind of behaviour. However, it is hard to see how mtDNA transfer has any conceptual links to racial superiority, and neither does it lend itself to extermination programmes or forced sterilisation. In short, if this is eugenics, then it looks like we might be able to reclaim the phrase: it could easily provide an example of what Nick Agar has called a 'liberal eugenics' – a form of eugenics that is chosen by women based on their conception of the good life, facilitated but not required by the state, and with no aspersions cast on anyone else (Agar 2004: 5). If we are determined to keep hold of the idea that making this kind of decision indicates a eugenicist mindset and is blameable, blame would presumably also have to attach to a woman

who chooses not to conceive at all in order to avoid suboptimal health in future generations. Since I take this to be an argumentative non-starter, it is hard to see how choosing to avoid suboptimal health in future generations *while nevertheless reproducing* is blameable. Or, working the other way, a critic of mtDNA transfer may be able to keep hold of the claim that it is eugenic, but only at the cost of relinquishing the claim that eugenics is always morally reprehensible and never praiseworthy. And if the latter claim is relinquished, it's hard to see what would motivate the criticism.

A related line of argument to the appeal to eugenics comes from a version of the 'expressivist objection'. The objection is, in its purest form, a response to the possibility of selective abortion in the light of genetic tests, and relies on the idea that to choose to abort expresses undesirable attitudes not about a given trait, but about the person, and the kind of person, carrying it (Parens and Asch 1999). The objection can be modified to apply beyond abortion debates. Granted that a person can only exist thanks to the genome they have, a preference for a different genetic inheritance may express a preference for different people from the ones who do or may exist. This objection has its critics; but if there's anything to it, would it speak to mtDNA transfer? I am not convinced that it would. This is for two reasons, once conceptual and one empirical. The conceptual reason is that – as I indicated above – though some genetic alterations may be identity-affecting, it is not at all certain that a change in a person's mitochondrial inheritance is. I do not have time here to explore the metaphysics of identity, but I would hazard a guess that it is not, because of the relatively few genes that mitochondria carry. This being the case, altering someone's mtDNA is going to change the life of the person, not the identity person living it. For sure, we are wishing away mitochondrial illness; but we are *not* wishing away the person who has it at the same time.

And this speaks to the empirical reason why I think that the expressivist objection does not undermine the arguments for mtDNA transfer: it has significant support from people who carry faulty mitochondria, who would prefer that they or their offspring – extant or merely possible – didn't. The HFEA commissioned a report into mtDNA transfer in 2012, which involved focus groups drawn from patients; they supported the techniques (HFEA 2013). It is possible that such people are speaking in bad faith, or have internalised a dismissive attitude towards themselves, or something like that – but this would require independent evidence. Without that, the expressivist objection, at least in respect of mitochondrial illness, seems to fail.

In fine, the concerns about the freedom to manipulate a person's genetic inheritance being a preamble to a eugenicist's charter are either toothless, or never get going at all.

Neither should we forget that the law in the UK is what it is, and nothing more. It permits one specific kind of genetic engineering, in specific circumstances, and permits that it be carried out only by a very few people.

It is true that any number of people have made the case for other kinds of genetic manipulation being permissible or even morally required (Harris 2007: ch. 3). But these are not allowed by any current legal instrument. If technologies such as CRISPR prove to be an effective and safe way to manipulate the genome, we may see moves in the appreciably near future to make use of it to fix other inherited illnesses. These proposals must be taken on their merits; it is probably fair to speculate that some would be acceptable, and others not. (An editorial in *Nature* in 2015 made a plea against making germline modifications to the human genome, largely because of the unknown risks – but, notably, made an exception for mtDNA transfer; Lanphier et al. 2015: 410–11.) None of this commits us to the view that liberalising the law in respect of *A* necessarily means that it will be liberalised in respect of *B*; and if it does happen to be liberalised in respect of *B*, it does not mean that all regulatory bets are off.

Freedom from illness

A little earlier, I made a passing comment that one may expect and require a reasonable polity to care about protecting the interests of its citizens and future citizens. This can be conceptualised as a guarantee of a certain kind of freedom – a freedom from exposure to risk. In this section, I want to explore that notion of freedom a little further in respect of mtDNA transfer.

We could treat mtDNA transfer as a kind of scientific freedom in the sense that it is a scientific technique that promises a kind of freedom to those on whose behalf it is performed. To be relieved of a burden is, at least colloquially, to be freed from it; it is perfectly natural to appeal to the language of freedom when talking about ending illness. For example, we might say that someone has been free from cancer for a certain time; conversely, we talk about the burden of illness. To add an adjective to this can be understood as describing the origin of this freedom; ‘scientific freedom’ is freedom that comes about by scientific means – and so also the removal of a burden by scientific means. There is no reason to think that mitochondrial illnesses would not fit into this linguistic pattern. Hence, if we think that one of the things that states should do is to maximise individuals’ freedom (compatible with maintaining comparable levels of freedom for all), then it looks like we ought to applaud legal moves to remove restrictions from the use of mtDNA transfer. Freeing medicine to make use of the technique is a part of freeing individuals from the burden of mitochondrial disease.

Neither is it simply the individuals carrying faulty mitochondria who would be freed by this scientific endeavour. Illness and disability impose burdens on others – often close family members. The burdens may be more onerous in some cases than in others; and in most developed countries the state will have some role in providing medical and social assistance. Nevertheless, even the mundanity of extra doctors’ appointments, filling in applications for assistance, and so on, will represent a drain on financial,

psychological and social resources. The possibility of using mtDNA transfer to minimise the risk of mitochondrial illness therefore offers a way to free many people beyond the future child of any number of burdens.

Yet, on the other hand, there is also the possibility that this form of ‘scientific freedom’ may be less straightforward than it appears at first. Notably, undergoing the procedure is not ‘cost free’: it does require IVF, which is burdensome in its own right. Now, though a burden is something from which an agent can be freed, it does not follow from this that every burden is a restriction of freedom. One can willingly take on a burden without diminishing one’s positive freedom. For example: choosing to pursue the dream of an Olympic medal brings with it a requirement to undergo a certain kind of training, but one is no less free for it. Though it’s burdensome, the training is part and parcel of one’s free choice. Likewise, a woman who felt it important not to pass faulty mitochondria to her children, but who didn’t want to avoid sex altogether, would be no less free for choosing a combination of contraception and IVF (and she may, in passing, free subsequent generations from mitochondrial illness).

All this assumes, though, that a woman’s desire for IVF is authentically hers. This is not a given. In examining a person’s choices, it is important to keep in mind the social context in which those choices are made. I have already noted how the possibility of mitochondrial transfer adds a third option to a decision about whether to proceed with reproduction; and all else being equal, a free choice may be made. However, while considering a woman’s choosing whether or not to reproduce, Chadwick observes that ‘[e]ither way, there are problems with blame and responsibility for the woman’ (2009: 13). This phrase is telling. For most women, pregnancy by natural means is the default option, and goes completely unremarked; if it is the sort of thing in the context of which the word ‘blame’ starts to appear, this is no longer the case. Rather, the expectation would seem to be that a woman carrying faulty mitochondria ought either to remain celibate, to terminate any pregnancy that arises from a contraceptive failure, or to use mtDNA transfer. Natural reproduction for such women is not the default option; it’s the exception, and a culpable one to boot. This being the case, our appeal to liberal eugenics might not be quite as straightforward as we may hope, for the supposedly free choice to make use of mtDNA transfer may be subject to social pressures that we do not often notice.

This worry cannot be dismissed as handwringing easily. In her *Genetic Dilemmas*, Dena Davis suggests that the availability of screening and termination for Down’s syndrome shifts the range of courses of action seen as acceptable such that testing (and presumably termination: if you’re going to have the child anyway, why screen?) become the default option, deviations from which are scrutable. Thus, she writes:

In my own mind I can discern a subtle shift in the way in which I view people with certain anomalies. Twenty years ago, seeing a woman in the supermarket

with a child who has Down syndrome, my immediate reactions were sympathy and a sense that that woman could be me. Now when I see such a mother and child, especially if the mother is older, I am more likely to wonder why she didn't get tested. (2001: 18)

Subtly, the norm has shifted; and if that shift can happen for this congenital condition, it would be strange to insist that something similar cannot happen in respect of mitochondrial illness and the choices that it brings. A woman's reproductive decisions – or non-decisions, in the case of unplanned pregnancies – become matters of public comment. And this matters just because the terms of a woman's decision about whether or not to use mtDNA transfer is, howsoever subtly, altered.

To this, it may be pointed out that many or most pregnancies, especially but not exclusively those in which there is a risk of some congenital health problem, become matters of public comment; this is a bare feature of the culture in which we live. This may very well be true – in which case, so much the worse for the idea that a woman's decision about her pregnancy is free from sociopolitical influence. Since most women who carry defective mtDNA know that they do, they may be under pressure similar to that which Davis describes. No reproductive decision is free from influence or scrutiny. This might mean that no reproductive decision is free, or that we have to rethink what it is to be 'free' in respect of reproduction. A decision about mtDNA transfer, though, probably isn't *sui generis*.

Whatever freedoms from illness mtDNA transfer promises, it may not guarantee freedom in every possible sense. In some cases, it might even generate social coercion, howsoever subtle it may be. I do not mean this to imply any particular normative position. Sometimes moral pressure on an agent is perfectly acceptable, if that agent would not otherwise act as morality requires and the pressure is proportionate, even if that pressure comes at the expense of the agent's freedom in part or in whole. It is not difficult to come up with thought experiments in which this is the case. I leave for others to decide whether the value of a future generation's freedom from mitochondrial illness is worth the partial sacrifice of a potential mother's moral freedom. All that matters for my purposes is to point out that 'scientific freedom' in the sense of lifting one kind of burden may bring another kind of burden with it.

Freedom to legislate

Permitting mtDNA transfer gave scientists and medics a freedom to carry out the technique that they had not had before; it gave parents the freedom to choose that technique; it gave future children a freedom from illness; but it might have created a subtle pressure on some mothers-to-be. This pressure should be taken seriously; but being careful about its exertion does not mean that mtDNA transfer cannot be offered without it.

There is one final aspect of freedom in this context that is worth mentioning. The *Daily Telegraph* reported in 2015 that a group of fifty MEPs had written an open letter to David Cameron, decrying any liberalisation of the law on mtDNA transfer. The letter expressed a ‘profound concern at the intention of the UK to permit the modification of the human genome’, and continued to say that

[y]our proposals violate the fundamental standards of human dignity and integrity of the person. Modification of the genome is unethical and cannot be permitted.

These proposals put the UK out in front of a race to the bottom so far as standards of human dignity are concerned. (Knapton 2015)²

Were this the case, one might wonder whether the UK Parliament had overreached itself – if, that is, there are some things that are beyond the scope of what any national legislature can allow. Certainly the UN, in the Universal Declaration on the Human Genome and Human Rights (art. 1) has suggested that the human genome is part of the common heritage of humanity. If something is part of the common heritage of humanity, then it would seem to lie outside of national legislatures’ demesne.

But, of course, dignity claims are notoriously slippery: what, exactly, does it mean to violate human dignity? Without a coherent account of human dignity, we cannot begin to assess that claim – let alone be expected to accept it. Likewise, worries about personal integrity are hard to understand for very similar reasons. Finally, it seems perfectly reasonable to deny that the *human* genome would be altered by mtDNA transfer, because no genes from another organism nor any synthetic genes are implanted. Besides, it is possible to insist that mtDNA transfer no more alters the human genome than does nature anyway: hundreds of pathogenic mtDNA mutations have been identified, and mtDNA in humans has a very high rate of natural mutation compared to nuclear DNA (Tuppen 2010: 115; Lane 2015: 226–7). A ‘pristine’ human genome would be a rather Platonic thing, unaffected by the alterations that make each of us what we are; but if we are going to allow that such a thing exists, we might easily hypothesise that mtDNA transfer restores the human genome to something closer to that ideal.

On a much more rough-and-ready level, though, we might think it enough to point out that mtDNA transfer promises to relieve great suffering, and that that is enough to mean that legislatures that seek to permit it should feel free to do so.

Notes

- 1 As I write this, it is reported that the first baby to be born after mtDNA transfer has been delivered in Mexico, which was apparently chosen because ‘there are no rules’. See Hamzelou (2016: 8–9).

- 2 The letter is widely reported, but I have not been able to track down the original.

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