**When the Milk of Human Kindness becomes a Luxury (and Untested) Good.**

**A Reply to Harris’ Unconditional Embrace of Mitochondrial Replacement Techniques**

Inmaculada de Melo-Martín, PhD

Weill Cornell Medicine

A new reprogenetic technology, mitochondrial replacement, is making its appearance and, unsurprisingly given its promise to wash off our earthly stains --or at least the scourges of sexual reproduction--, John Harris finds only reasons to celebrate this new scientific feat.1 In fact, he finds mitochondrial replacement techniques (MRTs) so “unreservedly welcome” that he believes those who reject them suffer from “a large degree of desperation and not a little callousness.”2 Believing myself to be neither desperate nor callous, but finding myself also no closer at all – not even after reading his article—to following Harris in welcoming these technologies wholeheartedly, it seems appropriate to respond.

Are there good reasons to celebrate this new technological achievement unreservedly? Does Harris offer any of them? ‘I think not’ is the appropriate answer to both questions. Perhaps the reason why Harris is ready for the unqualified embrace of MRTs is that the objections he entertains are not particularly good ones. Having debunked them, it might seem to follow that no good reasons could exist to be skeptical of this new scientific achievement. But, as should be obvious, this does not follow at all. Indeed, being disinclined to think of MRTs as much of a social achievement – even if an impressive technical one — and not sharing most of the misgivings Harris entertains as objections, it seems clear to me that debunking those objections does little to make the case for MRTs.

Be that as it may, I believe Harris dismisses too rapidly some of the concerns raised against MRTs and other forms of germline modification in general. I am with him that objections to MRTs based on the fact that these technologies will create children with three ‘parents’ are not particularly compelling. That said, my reasons for finding this argument unpersuasive are different from Harris’. Indeed, his seem quite unconvincing as reasons to reject this argument. He both claims that “no identity-conferring features are transmitted by the mitochondria,”3 and that mitochondrial DNA influences one’s “susceptibility to disease and suffering.”4 Well, it seems to me that influencing one’s susceptibility to disease and suffering is quite an identity-conferring feature. Indeed, it is the identity-conferring trait that women who will use these technologies want to prevent their children from having. As others have pointed out,5 health and disease are states of being that clearly inform personal identity and, thus, no matter how small the genetic contribution of the mitochondria, it nonetheless influences one’s susceptibility to disease and suffering, so it seems to make little sense to say that it has no effect on one’s identity. Moreover, although it might well be the case that the mitochondrial genetic contribution does not transmit any of the traits that confer the usual family resemblances (and given how much is unknown about the interrelations between mitochondrial DNA and nuclear DNA this might actually not be the case at all6), preventing the transmission of disease is in fact one of the most common “distinctive personal features in which both parents and children are interested.”7 Indeed it motivates most use of reprogenetic technologies. I, on the other hand, find the three-parent objection unpersuasive, not because I believe mitochondrial DNA is too unimportant to affect one’s identity, but simply because I welcome challenges to normative biogenetic ideals surrounding families. Of course, MRTs do nothing of the sort, as I’ll discuss shortly, but were they to do so, that would be, in my opinion, a point in favor of these technologies rather than against them.

 What about the alleged right to know one’s genetic origins? Well, I am equally unpersuaded by this concern, but again, not for the reasons Harris gives.8 I take it that his claim is that recognizing a right to know –and a duty to disclose I guess--would entail that many a family would find itself in hot water. But surely that would simply be something to consider when implementing the right to know –or the duty to disclose—not an argument against the right or the duty existing or against their moral appropriateness. If, as some do, one thought that the right to know one’s genetic origins is indeed a fundamental right, the fact that many people are actually ignorant of them would seem irrelevant to the validity of the alleged right, as it is irrelevant to the validity of a right to life, for instance, that the right is violated systematically all over the world. So my disinclination to make much of this alleged right to know one’s genetic origins has nothing to do with the phenomenon of non-paternity, but simply with the fact that no compelling grounds exist to support this presumed right. Furthermore, I believe that talk of a right to know one’s genetic parentage imbues genetic information with very special significance and thereby contributes to promote problematic beliefs about genetic essentialism.

 How about the fact that those on whom some risks of using MRTs might fall cannot provide consent to these interventions? This is a more complicated argument than Harris recognizes. Sure, inexistent people can, in virtue of the fact that they are indeed inexistent, provide no consent –or refusal for that matter—to any of our actions. However, the argument about the consent of future generations –or the children born through these technologies—is not about actual consent, or about the inability of inexistent people to give such a consent. It is about whether there are good reasons to believe that, if able to do so, those people would indeed consent to the interventions under consideration. And the answer to this question is, pace Harris, not a clear cut one. He seems to assume, without much evidence at this point, that MRTs will only benefit future generations and the children born by means of these technologies. As he puts it: “If the interests and probable wishes of such children are to be considered, they will (if they are rational, and who is rational at minus more than nine months?—not one in a thousand) vote “yes please.””9 For Harris, the issue at stake is one of doing what is best “all things considered.” But that is just the problem, people –not always unreasonably—make different assessments about what is best, all things considered. Thus, while for Harris it seems clear –unreservedly so apparently—that MRTs are a way to do what’s best for future children and generations, all things considered, others might not be so sanguine about it. After all, although Harris takes these technologies to be ‘safe enough,’ the evidential grounds for this assessment are pretty flimsy given that not a single human being has been yet born through these particular technologies. Moreover, the preclinical studies, even when reassuring, are not particularly extensive either. So, given how much is unknown about the short-term, not to mention long-term, effects of these technologies, to confidently declare that their use involves doing what is best for future generations, all things considered, seems –if I may say so—somewhat over-confident. Of course, if the question posed to future generations –or children—is “would you rather be born with or without a disease that can cause significant pain and suffering?” the answer seems obvious. But the question at this point would actually be a bit more complex, something like, “would you rather be born without a particular disease –one whose severity we have difficulty predicting and that thus might be not particularly burdensome rather than very burdensome -- and run the risk that in its stead you might suffer a worst disease, one that might not be apparent at all when you are born, but that might develop as you mature?” Clearly, equally reasonable people would give very different answers to this question simply because risk assessment is, at least in part, a subjective activity. Therefore, what is ‘safe enough’ for Harris, might not be deemed safe at all by the hypothetical child were she to be asked. But although we are not asking her, and one might not care about the fact that such consent –or refusal—cannot be given, one’s assessment of what risks are reasonable to impose on other unconsenting parties is certainly an important one.

 So, where does this leave those of us who are not particularly excited about MRTs? Are we desperate and callous? Well, as I have said, I find the three-parent objection and the alleged right to know one’s genetic parentage unpersuasive. I do not think either that the fact that some of those who might be affected by these technologies cannot consent is an objection against MRTs. Nonetheless, contrary to Harris, I believe that the evidence about the safety of these technologies is at this point completely inadequate, and that therefore an “all things considered” decision would actually call for the gathering of more evidence before we proceed.

 One might concede, however, that safety concerns will, at some point, be better addressed and though it is true that the proof is in the pudding when it comes to creating human beings with these technologies, if the benefits are thought to be worthy and we have more confidence about the risks and the uncertainties, the safety objection eventually might have to be jettisoned. So, let us assume for the argument’s sake that one is reasonably confident –as Harris clearly is-- about the fact that MRTs do not involve excessive risks. Should we embrace these techniques unreservedly? Are we callous if we don’t? That depends. Are the benefits worthy? Therein lies the rub. Clearly, Harris think they are. As he says, these new techniques –let’s also assume that they will be effective—will help “some 2,500 women in the U.K. have children related to them and avoid some terrible diseases.”10 Now, how much of a benefit is this? Well, that depends on how much importance one gives not –or not only-- to avoiding some terrible disease but to doing so while having children genetically[[1]](#footnote-1) related to oneself. After all, if avoiding the transmission of mitochondrial diseases were the goal, women who are at risk of passing on such disorders and who want to become mothers do have other options.

First, and most obviously, they can adopt a child. Millions of children exist in the world who need good homes. This would not only help women with mitochondrial disorders become mothers without risking transmission of such disorders but would also have the benefit of placing children in environments more conducive to their flourishing. Although it is true that adoption can be expensive and time consuming, these costs are unlikely to fare poorly when contrasted with those of undergoing MRTs. These technologies, which involve the use of IVF, are not cheap. IVF itself is relatively inefficient and the process of obtaining embryos with MRTs might make the pregnancy rates for these techniques –at least initially-- lower than usual for IVF outcomes.

 Second, these women can use eggs from other unaffected women. This alternative has the advantage over adoption of allowing women to experience pregnancy, although it requires putting women who provide the eggs at risk for no benefits to themselves. Granted, the availability of eggs is limited, but this problem affects not only the alternative I am proposing but MRTs themselves. In fact, this constitutes a more serious problem for MRTs because the manipulations required to obtain unaffected embryos appear to affect the viability of the resulting embryos. For example, in experiments to demonstrate the feasibility of MRTs more than half of the viable eggs used for spindle transfer showed abnormal fertilization.11 Thus, MRTs will require many more eggs –and thus putting many more women at risk-- to obtain the same number of viable embryos as egg donation procedures now produce. If MRTs turn out to affect implantation rates this will result in the need for even more eggs.

 Moreover, if reduction of the burdens of mitochondrial disorders were indeed the goal, research on basic and clinical studies on the causes, prevention, and treatment of these diseases will in all likelihood be more effective than research on MRTs. After all, even if all the women who could be eligible to use them did so –a big “if” indeed--, these technologies will have a relatively limited application. On the other hand, research on the diseases themselves and on more effective treatments for mitochondrial disorders would be of use to all of those suffering from these diseases.

 Of course, what MRTs really do is allow women to have unaffected children *and* genetically related ones. But clearly, although the ability to have genetically related offspring is highly valued by many people, it is implausible to argue that satisfying such desire should constitute a scientific priority given the many pressing needs that exist. Although strong and persuading arguments can be given for the goods of parenting,12 few would argue that a genetic connection is a necessary condition for those goods. Sure, were we living in a world of unlimited resources, then it would make sense to attend to not only people’s needs but to people’s legitimate desires. But I hardly need to point out that we do not live in such a world.

Now, I would like to remind readers at this point that Harris is happy to dismiss at least some strongly held desires. Recall that, although he acknowledges that “many people think that children have a right to know the identity of their progenitors,”13 he does not find this fact particularly compelling. Hence the fact that many people value having genetically related children should simply lead us to nod in acknowledgment and proceed to state that, in a world with significant unmet needs, such a fact is not sufficient to support the development and implementation of some new technological innovations.

Furthermore, if the ability of women to have healthy and genetically related children is actually the goal, then safe and often cheap alternatives already exist that can help accomplish it much more efficiently than MTRs can. For instance, a recent report evaluating the Millennium Development Goals for maternal and child health shows that 17,000 children die every day from preventable causes and millions of women are dying or suffering from acute or chronic illnesses due to childbirth.14 The report also indicates that effective preventive and treatment interventions exists for reproductive, maternal, newborn, and child care. And although most of maternal and child mortality and morbidity occurs in developing nations, the problem also exists in industrialized countries. In particular both the UK, where MTRs have been legalized, and the US, where such legalization is under consideration, have some of the worst child-mortality rates of Western industrialized nations.15 Investment on basic and applied research in pregnancy and infancy would thus go significantly further than investment in the development of MTRs to achieve the goal of permitting women to have healthy and genetically related offspring. In the UK, for instance, evidence indicates that less than 5% of total research funding from public and charitable sources is directed at child health.16 Spending commensurate with the burdens of maternal and child morbidity and mortality could allow many more women to enjoy the benefits of having healthier and genetically related offspring. Needless to say, these investments will have additional benefits that are lacking in the case of MRTs. After all, funding for these alternatives is likely to benefit members of the population who are already marginalized and thus their effects on both the wellbeing of these individuals and of society as a whole is bound to be much more significant. We would do well to remember that scientific and technological benefits should accrue to all members of the public. Science and technology are, not incidentally, public goods.

What this means is that funding for any scientific and technological program has opportunity costs and therefore decisions about what counts as a benefit and how much of a benefit it is should take into account not only the outcomes of, in this case MRTs, but also the opportunity costs of these technologies. Assessment of benefits require consideration about how to obtain the best results in the most efficient ways. By this account, MRTs are unlikely to be the wisest of choices.

Not wanting to accuse Harris of callousness for ignoring the significantly higher benefits that could be achieved by using our scientific resources in other ways, I concede that he might be sympathetic to these concerns. I take it however, given his unreserved embrace of MRTs, that no matter how sympathetic he might be, ultimately he does not find these objections compelling. He might argue that insofar as the use of these technologies is funded by patients, claims about the opportunity costs for other potential research projects and treatments are of little interest. But this seems incorrect. Even in the US, where reprogenetic technologies are mostly accessible according to people’s ability to pay, some insurance companies cover some of these procedures. In countries with national care systems, like the UK, access to these technologies is covered for at least some individuals. Furthermore, research to develop MRTs may receive public funds which will not be available for other projects. And even if the funding for these technologies were completely private, opportunity costs still exist, as again such funding will not be open for other research programs – if we exclude the unlikely scenario in which such funding is only called into being by the possibility of it being used for MRTs. And in any case, this ignores the fact that the direction of research can be affected in ways that ultimately result in opportunity costs. For instance, even if only private resources were used to develop and implement MRTs, and only MRTs, focus on this type of research might lead scientists away from other, more effective, alternatives. Furthermore, the training of researchers involves the use of public resources, so their subsequent use for purely privately-funded research can nevertheless be seen as involving the diversion of public funds. Finally, the use of MRTs, even if paid completely out of pocket, can still have effects on public funds in various ways. Ensuring follow-up of children born through MRTs to assess their health and wellbeing will surely fall on government agencies. Excess costs to healthcare systems could also result from the increased use of services by women who use MRTs and their children. In summary, even in the unlikely scenario that no public funding were to be used for the development or use or MRTs, opportunity costs would still be created.

Harris would still be unpersuaded, I take it. He might object that the more effective alternatives that I have proposed would require challenging and perhaps unattainable institutional changes. Global economic pressures, for instance, make it difficult to provide the necessary means to care for the health of the millions of mothers and children who could benefit and my proposals for improving the health and wellbeing of mothers and their genetically related offspring could require an extensive period of time before results are obtained.

I admit that this is quite correct. Nonetheless, there are several problems with these responses. First, even when the objection calls appropriate attention to the difficulties of social and institutional changes, this should hardly lead anyone to conclude, as Harris does, that MTRs ought to be unreservedly welcomed. On the contrary, insofar as these statements are correct, dispirited resignation would be a more appropriate attitude. After all, it is clear that better means exist to achieve the ends that these new reprogenetic technologies presumably set out to achieve. That nonetheless the development of these technologies appears inevitable17 and other, more effective means will fail to be implemented does not seem to be a reason for rejoicing.

And let’s not forget that Harris’ wholehearted embrace of these technologies is unlikely to contribute to changing the status quo. Thus, evaluations of MRTs, such as the one Harris offers, that simply assume that other, better, alternatives are impracticable, become a self-fulling prophecy, sanctioning current conditions without any objections. In fact, if half of the ink that Harris has spilled rejecting arguments against reprogenetic technologies had been directed to calling attention to the mismatch between goals and the means to achieve them, perhaps alternative and more effective means would not appear so difficult and unattainable. At the very least, it would be clear that rejecting the development and implementation of MTRs is the result not of fears of three-parent children, or the alleged right to know one’s genetic origins, but of the desire to ensure that the goals that we presumably desire to achieve are accomplished in the most effective ways. Besides, it would become clear that if desperation is the attitude of those who object to these technologies, such desperation seems appropriate: it’s a desperation born of the recognition that scientific and technological developments are being directed in ways that are not particularly socially responsive. And, of course, if would also be clear that if accusations of callousness need to be directed at anyone, they should hardly be directed at those who believe that we should use our scarce resources to benefit as many mothers and children as possible. I also agree with Brecht’s Galileo that the joy and the hope of science is to lighten the burden of existence. It would certainly be nice if the burdens were alleviated not for a select few but for as many people as possible.

Now, are these principled objections to MRTs? In an ideal world perhaps not. In ours, I think they are. And they surely are reasons to deny these technologies an unreserved welcome.

**References**

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4. See note 1, Harris 2015:7.

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7. See note 1, Harris 2015:6.

8. de Melo-Martín I. The ethics of anonymous gamete donation: is there a right to know one's genetic origins? *Hastings Cent Rep* 2014;44(2):28-35.

9. See note 1, Harris 2015:8.

10. See note 1, Harris 2015:5.

11. Tachibana M, Amato P, Sparman M, Woodward J, Sanchis DM, Ma H, et al. Towards germline gene therapy of inherited mitochondrial diseases. *Nature* 2013;493(7434):627-31.

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13. See note 1, Harris 2015:7.

14. Requejo JH, Bhutta ZA. The post-2015 agenda: staying the course in maternal and child survival. *Arch Dis Child* 2015;100 Suppl 1:S76-81.

15. Taylor S, Williams B, Magnus D, Goenka A, Modi N. From MDG to SDG: good news for global child health? *Lancet* 2015;386(10000):1213-4.

16. See note 15,Taylor et al. 2015.

17. See note 5, Baylis 2013.

1. I assume that ‘genetically’ is inadvertently missing from Harris claim, otherwise, his argument would make little sense as one supporting MRTs. In any case, it is important to point out that one can relate to one’s children in ways that have nothing to do with sharing a genetic connection. [↑](#footnote-ref-1)