Jacob Shrewsberry. Critical Reading Assignment #3: Bioethics Paper.

Mitochondrial Gene Transfer refers to a set of techniques which replace mitochondrial DNA (mtDNA) in oocytes in order to prevent transmission of mitochondrial diseases to offspring. These require an mtDNA donor, and two main methods are included in the case report we have studied. These are the Spindle transfer and the Pronuclear transfer. The Spindle transfer involves removing the maternal chromosomes from the original oocyte, and placing them into a donated oocyte, thereby resulting in an oocyte with maternal DNA and donor mtDNA. The Pronuclear transfer is achieved through similar steps, after the egg is fertilized.

These techniques are part of a subset called germline gene therapy, because it modifies inheritable traits. For many, this raises ethical concerns such as, but not limited to the following: The lack of consent of the potential offspring, the concept of the offspring having three parents, and the possibility of engineering offspring for desired traits. I am in favor of the use of these techniques, because I find that these ethical concerns do not outweigh the benefits of the techniques, and these concerns can be addressed through regulation.

The idea that mitochondrial gene transfers results in the child having three genetic parents is a hyperbole. The mtDNA of the donor amounts to 0.1% of genetic material in the offspring. This is not a substantial enough contribution to name the donor as a genetic parent of the offspring. While the offspring cannot consent to this genetic modification, they also cannot consent to inheriting the genes of their parents. In the end, the mother is choosing to modify her genetic material, just as she would choose the father who would be donating their genetic material via sperm. The offspring could not consent in either case, so I find this to be an invalid point. The possibility of "Designer Babies" is a real possibility in the future due to germline gene therapies such as this. Fear of misuse is one reason why we have regulatory committees. Regulations can be set for when germline therapies are acceptable. This way, germline therapies such as mtDNA modification can be used for the potential of curing debilitating and deadly diseases, while preventing abuse to the best of our ability.

There have also been concerns for the safety of mtDNA replacement, which seem to have been refuted considerably well. Long-term studies have failed to find any evidence that mtDNA replacement causes any abnormalities. This is, however, without human trials. Human trials should be conducted, yet these techniques are heavily restricted or outright banned from use in clinical trials. Concerns for the safety of such techniques is understandable, but families that would pass on diseases, yet have only the option of genetic reproduction should have the opportunity to opt in to such a clinical trial. These techniques could improve the lives of many future humans and should be explored with an open mind rather than a fearful one.