Critical Reading Assignment #3: The Ethics of Mitochondrial Replacement Therapy

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Mitochondrial DNA is a circular genome in the human body that is crucial for energy production. Mutations in the mitochondrial DNA can result in gene disorders and can be inherited maternally. These mutations can affect a lot of vital organs and develop in oocytes and somatic cells, making these disorders difficult to treat. With recent scientific developments, mitochondrial DNA replacement therapy was discovered to prevent the passing down of gene disorders from mother to offspring. Like many new treatments, the ethical dilemma arises behind the idea of altering a baby's genetics. I believe that using mitochondrial DNA replacement therapy is justifiable in preventing the transmission of diseases to offspring.

Mitochondrial DNA replacement therapy works by transferring the mother's nuclear DNA to a donor egg that does not carry the mitochondrial DNA mutation. Two techniques can be used: spindle transfer (ST) and pronuclear transfer (PNT). With the spindle transfer technique, the meiotic spindle can be transferred into a donated, healthy oocyte, where it can be fertilised and transferred back to the patient. On the other hand, the pronuclear transfer technique transfers the zygote after fertilisation. Overall, both techniques have been tested to be generally safe and beneficial. Although the outcome of this procedure is generally positive, the main ethical concerns are the long-lasting effects and the extent of modification.

Despite those concerns, I believe that it is ethical to apply mitochondrial DNA replacement therapy because it provides a way to prevent life-threatening diseases in children caused by mutations. Many people debate that altering an offspring's genetics could lead to irreversible risks, ultimately affecting future generations. However, tests have already proven to show no signs of abnormality in children after transfer. Another issue is that allowing genetic modification could open doors to altering traits beyond health. The idea of designer babies has come up as a result of this debate, as people would consider unnecessary cosmetic modifications to their children. To eliminate that concern, I do believe that there should be regulations on certain modifications to babies, only allowing those with health benefits. These procedures should be discussed not only with scientists and doctors, but also with ethicists. While many do argue that there are other issues that concern genetic modification, I do think that the benefits outweigh. The goal is to eliminate the suffering of future generations, which aligns with the ethical principle of promoting well-being.

By using mitochondrial DNA replacement therapy, patients with mutant mitochondrial DNA are able to transfer their genes to healthy oocytes without the worry of passing down any genetic disorders. Since many of these disorders are hard to treat, it is better to eliminate the chances of inheriting them. Therefore, I do think that it is ethical to consider mitochondrial DNA replacement therapy as it can improve the health of many future generations.