



Mains Practice Question

Q. Discuss the concept of Mitochondrial Replacement Therapy (MRT) and its potential implications for human health and reproduction. (250 Words)

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Approach:

- Start your answer by defining Mitochondrial Replacement Therapy.
- In the body section, mention its potential implications.
- Conclude accordingly.

Introduction:

Mitochondrial Replacement Therapy (MRT) is a medical technique that aims to prevent the transmission of mitochondrial diseases from a mother to her offspring. Mitochondrial diseases are genetic disorders caused by mutations in the DNA of mitochondria, which are the cellular powerhouses responsible for producing energy. These mutations can lead to severe health conditions affecting various organs and systems in the body.

Body:

This procedure has potential implications for human health and reproduction:

- **Preventing Mitochondrial Diseases:** MRT replaces faulty mitochondria to prevent transmission of mtDNA mutations that cause severe mitochondrial diseases. It reduces the risk of debilitating conditions caused by mitochondrial dysfunction.
- **Safety and Efficacy:** It could pose safety and efficacy challenges, as the long-term effects of MRT are unknown and the techniques are still experimental.
- **Unintended Consequences:** Critics argue that this procedure could lead to unintended consequences and could open the door to designer babies or genetic enhancements.
- **Inheritance and Genetic Identity:** MRT involves the introduction of genetic material from a donor, leading to the inheritance of mitochondrial DNA from a third individual. This raises questions about genetic identity and familial relationships. The long-term impact on family dynamics and the psychological well-being of individuals conceived through MRT should be considered.
- **Social and Cultural Implications:** MRT may have broader social and cultural implications. It challenges traditional concepts of reproduction, inheritance, and kinship.

Conclusion

Mitochondrial Replacement Therapy has the potential to prevent the transmission of severe mitochondrial diseases but raises important ethical, safety, and regulatory considerations. As this technology advances, ongoing research, robust regulations, and careful evaluation are necessary to maximize the benefits while minimizing potential risks and societal implications.

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