



## Mains Practice Question

**Q.** Analyze the ethical considerations surrounding the use of gene editing technologies, such as CRISPR-Cas 9, in human embryos and its potential impact on future generations. (150 words)

18 May, 2023 GS Paper 4 Theoretical Questions

### Approach

- Start your answer with the introduction to CRISPR Cas 9 technology.
- In body section, mention the ethical issues involved in using CRISPR Cas 9
- Conclude with way forward.

### Introduction

- CRISPR is an acronym for "Clustered Regularly Interspaced Short Palindromic Repeats." Cas9 is basically an enzyme that is used like a pair of scissors to cut two strands of DNA at a specific location to add, remove or repair bits of DNA. This technology allows scientists to modify the DNA of living organisms with high precision.

### Body

The use of CRISPR-Cas9 technology raises a host of ethical considerations and potential impacts on future generations:

- **Informed Consent:** It raises questions about the level of understanding and consent individuals have regarding the potential risks, benefits, and long-term consequences of altering the genetic makeup of future generations.
- **Unintended Consequences:** Gene editing techniques are still relatively new and not fully understood. The potential for unintended consequences and off-target effects remains a concern.
- **Detrimental to Humanity:** Gene editing can address genetic diseases and disabilities but using it for non-medical purposes raises ethical questions about altering traits and enhancing certain characteristics. This could exacerbate social inequalities and lead to an "arms race" of genetic enhancement.
- **Loss of Autonomy:** Alterations made in germline cells (sperm, eggs, and embryos) would be passed on to future generations, raising questions about the implications for the autonomy and well-being of those individuals who have no say in the decision.
- **Equity and Access:** Gene editing technologies may not be widely accessible due to cost, availability, or regulatory constraints, which could exacerbate existing social inequalities if only a privileged few can access its benefits.
- **Environmental Justice:** Altering the genetic makeup of humans could have unforeseen effects on ecosystems, species interdependence, and the evolution of future generations.

### Conclusion:

The use of gene editing technologies in human embryos raises profound ethical considerations. Striking a balance between the potential benefits and risks, ensuring informed consent, avoiding unintended consequences, and addressing issues of equity and global governance are crucial for responsible and

ethical application of these technologies and their impact on future generations.

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