



Chimera Research: Human Cells in Monkey Embryos

Why in News

Recently, researchers at the **Salk Institute for Biological Studies in the US** in a research called **Chimera Research** have **for the first time grown human cells in monkey embryos**.

Key Points

▪ About the Research:

- **By integrating human cells into the embryos of [macaque monkeys](#), a chimeric tool** has been created.
 - **Chimeras** are organisms that are **made up of the cells of two distinct species**, in this case humans and monkeys.
 - For instance, if this hybrid embryo was placed in the womb of a monkey, **it could possibly grow into a new kind of an animal** (however this was not the aim of this study).

▪ Purpose of the Research:

◦ Understanding Human Development & Drug Evaluation:

- Ability to grow cells of two different species together offers scientists a **powerful tool for research and medicine**, advancing current understanding about early human development, disease onset and progression and ageing.
- It could also **help in drug evaluation and address the critical need for organ transplantation**.

◦ Provides New Platform to Study Diseases:

- Chimeric tools provide a new platform to study **how certain diseases arise**. For instance, a particular gene that is associated with a certain type of cancer could be engineered in a human cell.
- It can help in **studying the course of disease progression** using the engineered cells in a chimeric model, which may be able to tell them more about the disease than results obtained from an animal model.

▪ Reason for Choosing Macaque:

- In a 2017 study, researchers **integrated human cells into pig tissues** as they thought that pigs, whose organ size, physiology and anatomy are similar to that of humans, could help them in creating organs that could ultimately be transplanted to humans.
- As the **experiment failed** due to **evolutionary distance between pigs and humans** (about 90 million years) the researchers **decided to pick a species that was more closely related to humans**, hence macaque monkeys were chosen.

▪ Concerns:

- **Not Natural and have Survival Issue:**

- Some rare hybrid animals exist naturally and were probably the result of **unintentional cross breeding** between animals of different species.
 - In 2014, a rare hybrid animal called **Geep (Goat+Sheep)** was born in an Irish farm. Geep was a hybrid between a goat and a sheep, a result of the two mating.
 - Generally, different species don't cross-breed and if they do, their **offspring don't survive** for long and are prone to infertility.

- **Infertility:**

- **Mules** are another example of a hybrid animal that are the result of mating between a female horse and a male donkey.
 - As per the American Mule Museum, **these hybrid animals are the result of intentional breeding by humans**, which they first undertook in the ancient times.
 - While mules can live a long healthy life, **they are infertile** which means that they cannot have offspring of their own.

- **Injustice Against Animals for Human Benefit:**

- Although researchers have made it clear that the chimeras created with macaques will not be used for human organs still **there is skepticism since others feel that one of the goals of chimera research is to create organs that can be transplanted to humans.**
- Chimera research **has the potential to worsen injustice against animals** and also point out the fairness in using part-human animals to meet human needs.

- In 2018 a scientist in China claimed to have produced genetically modified babies using the gene editing technique **CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)**. He was sentenced to prison for three years, with a fine of 3 million yuan (approx. Rs 3 crore), for illegal medical practice.

- **Indian Laws on Hybrid Animals:**

- In India production of hybrid animals has been banned since 1985..
- **Genetically Modified Organisms (GMOs)** and the products are regulated under the **"Rules for the manufacture, use, import, export & storage of hazardous microorganisms, genetically engineered organisms or cells, 1989"** (referred to as Rules, 1989) notified under **the Environment (Protection) Act, 1986.**
 - These Rules are **implemented by the Ministry of Environment, Forest and Climate Change**, Department of **Biotechnology** and State Governments through six competent authorities.
 - The Rules, 1989 are **supported by a series of guidelines** on contained research, biologics, confined field trials, food safety assessment, environmental risk assessment etc.

Way Forward

- Genetic modification like chimera studies continues to be a **subject of major debate**. In developing countries like India, **genetically modified crops are also a contentious topic.**
- Tampering with the genetic code in human beings is more controversial, **as any such change can be passed down to future generations.**

Source: IE

