The first human-monkey embryos

(Mains GS 3 : Science and Technology: Recent developments and their applications and effects in everyday life & General awareness in the fields of IT, Space, Computers, Robotics, Nanotechnology, bio-technology)

Context:

- Scientists have created the world's first monkey embryos containing human cells in an attempt to investigate how the two types of cell develop alongside each other.
- The embryos, which were derived from a macaque and then injected with human stem cells in the lab, were allowed to grow for 20 days before being destroyed.

The chimera:

- This type of life form termed as a chimera, named after the fire-breathing monster of Greek mythology that was part lion, part goat and part snake.
- It's hoped that part-human chimeras — essentially animal bodies with some human organs or other characteristics — might one day offer clues to help us treat human diseases, as well as providing organs to transplant to humans.
- But for these purposes, part-human chimeras will first have to be born and this research takes us one step closer to that eventuality.

Why make chimeras?

- There are several rationales for pursuing this line of research.
- Human-monkey chimeras could be created to study parts of the brain, for instance, so we can better understand Alzheimer's Disease.
- Another goal is to grow human organs for transplantation by "deleting" the relevant organ from the animal's genetic instructions and replacing it with human stem cells to fill the developmental niche.

The previous researches:

- Previously, the same researchers explored this avenue in pigs as pigs are ideal because their organs are about the same size as ours.
- However, not enough human cells “took” to create a functional chimera and the research failed.
- But, Monkeys are evolutionarily closer to us, so there’s a greater chance that cells will interact effectively with each other.
- The stated goal of the human-monkey experiments is to understand and perfect the development of chimeras in primates before transferring the technology to pigs.
- As we intensively farm and eat pigs, there are thought to be fewer ethical concerns with harvesting organs from pigs.
- Hence, primate research is a stepping stone, not a goal itself.

Future chimeras:

- Whether part-pig or part-primate, living chimeras that feature human cells are certainly possible in the future.
- How such animals would look and function would depend on the numbers of nonhuman and human cells.
- Previous experiments, for instance, have produced a goat-sheep entity that had both woolly and coarse hair.
- This research is likely to provoke moral revulsion.
- If pigs or monkeys are eventually developed with humanised features, it could cause major public opprobrium, perhaps setting back public acceptance of science significantly.

The moral status:

- Moral status is the concept of treating life forms according to their interests and capacities.
- For example, humans are generally thought to have higher moral status than monkeys, who have higher moral status than pigs, who have higher moral status than worms.
- Moral status is linked to mental capacities such as consciousness, self-consciousness, moral capacities and rationality.
- In the future, some human-nonhuman chimeras could develop mental capacities between ordinary animals and humans.
- That presents a huge challenge for those of us who work to determine the moral status of living creatures and the rights and obligations that follow that status.

Tackling ethical concerns:

- There are two ways to tackle ethical concerns over the moral status of part-human chimeras.

- Scientists could genetically edit human stem cells so they do not become brain cells — but this may not be possible or even desirable, in the case of building models for human brain disease.
- Alternatively, scientists could allow such chimeras to be born so that we can determine their moral status by studying them.
- This would raise other ethical issues, as it would require the newborn to be subjected to novel behavioural tests of cognition, communication and other mental capacities.

Conclusion:

- Chimera discoveries could give humans capacities found elsewhere in the animal kingdom, like a bat's sonar.
- If we accept moral status based on a creature's capacities, such enhanced humans could one day be regarded as superior to us.
- As we're already struggling with issues of equality between human beings, it would seem we're poorly prepared for the ethical challenges presented by future advances in chimera research.