



A 'lifeline', animal farmed

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(Mains GS 3 : Recent developments and their applications and effects in everyday life)

Context:

Recently, the University of Maryland School of Medicine announced that it had successfully transplanted a genetically-modified pig heart into a patient with life-threatening arrhythmia.

Xenotransplantation:

- Xenotransplantation (transplanting organs across different species) is any procedure that involves the transplantation, implantation or infusion into a human recipient of either (a) live cells, tissues, or organs from a nonhuman animal source, or (b) human body fluids, cells, tissues or organs that have had *ex vivo* contact with live nonhuman animal cells, tissues or organs.
- Xenotransplantation was first tried in humans in the 1980s however, the experiment was abandoned after the famous case of the American Baby Fae who was born with a congenital heart defect and received a baboon heart in 1984.
- The surgery was successful, but the baby died within a month of the transplant after it was rejected by her body's immune system.
- However, pig heart valves have been used for replacing damaged valves in humans for over 50 years now.

Demand exceeds supply:

- Transplantation to replace failing organs is one of the spectacular achievements of medicine in the last century.
- The number of transplants has increased, the list of organs transplanted has grown and outcomes have got better.
- But the field is also a victim of its own success as the numbers of those needing transplants now far outnumber the availability of human organs.
- Both living and dead humans are being sourced as donors but because of scientific, ethical and social challenges, the number of human donors remains restricted.
- The desperation for organs also creates a fertile ground to lure the vulnerable to sell their organs as we witnessed in the recent kidney scandal in Assam.
- Xenotransplantation also overcomes another hurdle in human to human transplant as one does not have to seek consent from an animal which can be sacrificed for the organ.

Brief history:

- The use of animal organs to replace diseased human ones is a very old idea and some of the earliest blood transfusions were from animals.
- Early kidney and liver transplants were attempted from baboons and chimpanzees as these primates were considered closest to humans.
- In the early 1960s, a surgeon called Reemtsma in New Orleans performed 13 chimpanzee to human kidney transplants; However, most of these transplants failed and were gradually given up.

Interest in pigs:

- There are several reasons why scientists have now zoomed in on pigs which are otherwise shunned creatures as a source.
- One interesting reason is that in the western world, it is socially more acceptable to breed pigs for this purpose.
- From a scientific viewpoint, pigs are genetically modifiable to reduce the chances of rejection by the human body.
- There are concerns about the transmission of pig viruses through the transplant but this barrier has also been partly overcome by bio protection and genetic manipulation.

Issue of animal rights:

- Xenotransplantation, if found compatible in the long run, could help provide an alternative supply of organs to those with life-threatening diseases.
- However, the animal rights institution PETA has decried the pig heart transplant.

- It said: “Animals aren’t tool-sheds to be raided but complex, intelligent beings. It would be better for them and healthier for humans to leave them alone and seek cures using modern science.”

Conclusion:

- An increasingly common cause of death and suffering is end stage failure of critical organs (heart and liver).
- Thus, xenotransplantation shows promising future but it should be regulated properly and available only when a patient with a life-threatening condition has no other options.