

# Cross Species Transplant (Xenotransplant)

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Xenotransplant is the transfer of organs, living cells and tissues from one species to another. The transferred organs and genetically altered in order to reduce the risk of rejection by the human body.

There are many benefits from this type of transplant. Right now there is a huge world-wide shortage of donor organs. Approximately sixty percent of people waiting for an organ transplant die before they can receive the correct organ. Xenotransplant would almost eliminate the waiting list because there is a plethora of available animals.

A second benefit would be the treatment of life-threatening and debilitating diseases. For example, scientists from Harvard Medical School have been successful in curing a rat of Parkinson's disease using transplanted transgenic pig neurons in order to restore brain function. Other experiments have



been performed using Xenotransplant to cure such diseases as diabetes, liver failure and cancer.

Because this research is still very new, there are many problems to

overcome. One of the biggest problems so far has been immune rejection (hyperacute rejection). Mammalian cells have "markers" (also known as antigen expression) so that their bodies can recognize what is suppose to be in the body and what is not. Therefore, when a pig cell is implanted into a human, the human body will reject it.

However, there has been new research, thanks to genetic engineering, to alter the cells in pigs so that they more closely resemble those of a human. These transgenic pigs bring about less ethical concern than using primates and are more easily controlled for viral infections.

Another way scientists are considering to block hyperacute rejection is by decreasing the number of pre-existing antibodies in the human body. This is a dangerous method because it is basically shutting down a person's immune system.

Disease transmission (xenozoonosis) is also a problem. A disease that exists in an animal that might not affect it, might harm a human. For example, porcine endogenous retrovirus is a virus that pigs are immune to but can potentially infect human cells.

There is a lot of controversy with xenotransplant. Ethical concerns have been brought up addressing animal testing and animal cruelty. Religious matters regarding pigs have also been looked at.

The future does not look promising for xenotransplant. In 1999 the Council of Europe recommended a worldwide ban on xenotransplant. In 2005 the Australian National Health and Medical Research Council declared a 5-year suspension on all animal-human transplants in order to continue research.