Xenotransplantation and You!

By Yazeed, EC, Griffin, Archer, and Ingrid

What is Xenotransplantation?

- Xenotransplantation is when living animal cells, tissue, and organs are transplanted from one species to another
- Doctors first tried to transplant animal organs into humans over 100 years ago.

Background of Xenotransplantation

- 123,973 people on waiting list for organs
- 18 people die everyday while waiting for organs
- Public Health Service prepared to begin procedures
- Risk of fatal disease prevents these procedures from happening

History of Xenotransplantation

- Received significant attention in the 1960’s
- Between 1963-1993, 31 clinical procedures from animal donors were performed in the US and South Africa

Choosing a Donor Species

- Non-human primates (Chimpanzees) were originally used as donors
- However, the spread of infectious diseases and ethical issues discontinued the use of their organs
- Most researchers are now using pigs as donors

Why Pigs are Good Donors

- They are easy to breed and have larger litters
- Pathogen-free pig breeds are available
- Pigs organs are similar in size to human organs
- Risk of infectious diseases is lower than in non-human primates
- Pigs are already killed for food, so using pigs may raise fewer ethical concerns than non-human primates

Promising Pig Transplant

- Uses microencapsulation to protect the cells from the immune system
- In New Zealand, Living Cell Technologies (LCT) is pioneering this technology
- Protects pig cells from the recipient's immune system with a special seaweed-based coating
- May be used to treat diseases like diabetes, Parkinson's disease,Huntington's disease, stroke and hearing loss.

Rejection

- There are three types of rejection
  - Hyperaccurate: rapid inflammation, thrombosis and necrosis of the transplant.
  - Acute vascular rejection: Still not completely understood but shows the same effect as hyperaccurate but after 2-3 days.
  - Chronic rejection: long-term slow rejection of the tissue via fibrosis in the blood.

Benefits

- Annihilates need for human organ transplantation
- Organs now only for “recreational” activities
- Faster healing
- Chance of infection could lead to research of such diseases and their prevention

Risks

- Obvious risk of possibly incurable diseases
- Rejection of foreign cells and materials by body
- People could end up as unstoppable bear-human hybrids

Bibliography

- http://web.stanford.edu/dept/HPS/transplant/html/fda.htm
- http://www.bio.org/articles/xenotransplantation-benefits-and-risks-special-organ-transplantation
- http://www.organdonor.gov/index.html
- http://www.biotechlearn.org.nz/themes/xenotransplantation_and_organ_donation/history_of_xenotransplantation