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BioMedical Seminar
Artificial Heart

The heart is to be considered the most vital organ of the body. It is the engine that runs the most complicated system, the body. This organ is a muscular pump that maintains oxygen and blood flow throughout the entire body. All cells in the body need oxygen to function correctly ultimately leading to homeostasis. The average heart pumps 2,000 gallons of blood per day. Just like an engine in a car, this organ can break down and pump less efficiently if not taken good care of. This is a condition called heart-failure.

Until recently, the only option for many heart-failure patients has been heart transplants. A heart transplant is when a heart from another person is surgically installed into a patient's chest. This allows the patient to live up to about a year longer. However, in the United States alone there are only about 2,000 heart transplants performed yearly. This means that there are tens of thousands of other people diagnosed with heart-failure who are dieing while waiting for a donor heart. This brought forth the idea of an artificial heart.

The AbioCor implantable replacement heart is a huge step in medical technology. It is the first self-contained artificial heart and has high expectations on life expectancy for heart-patients. The AbioCor is a medical device made up of 6 components. However, the core mechanism of this device is the hydraulic pump that shifts an incompressible fluid back and forth from one side of the heart to the other which acts as a pump sending blood to the lungs via an artificial ventricle and to the rest of the body through the aorta. This hydraulic pump has a gear inside of it that spins at 10,000 revolutions per minute to create pressure. There is also a valve inside this mechanism that opens and closes to allow flow of the incompressible fluid from side to side.

The FDA approved 15 trials of the use of the Artificial Heart to volunteers with heart-failure. The first operation was performed on July 2nd 2001. Since then another 11 operations have taken place. The last one being on February 20th 2004. So far all patients have died but have lived an average of 5 to 6 months after the operation. Improvements will be made and hopefully allow patients to live up to a year after the transplant.

Sources:

- http://science.howstuffworks.com/artificial-heart3.htm
- http://heartdisease.about.com/library/weekly/aa042301a.htm
- http://www.swedish.org/16763.cfm
- http://www.chfpatients.com/implants/artificial_hearts.htm