

# AbioCor® Implantable Replacement Heart

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Biomedical Engineering Seminar I

AbioCor® Implantable Replacement Heart is developed by Abiomed Inc.. The product is used to extend and improve the lives of those in otherwise hopeless situations. This is the first completely self-contained artificial heart meaning there are no tubes or wires penetrating the skin. The heart is used to maintain the body's circulatory system.

This artificial heart is used in the replacement of the left and right ventricles. Currently it is only in use for patients with permanent damage. Its use is for a more normal lifestyle. Heart failure patients can now shower and go for small walks, without assistance, when before this was not possible.

The current requirements to receive the AbioCor® are:

- 1) End stage Heart Failure
- 2) A life expectancy of under 30 days
- 3) Not eligible for a natural heart transplant
- 4) People with no other options



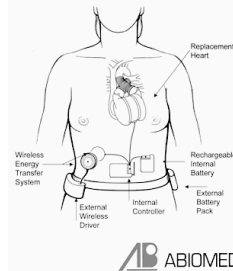
The AbioCor® helps benefit some of the 700,000 people who die each year from heart failure, the number one cause of death in the US. Each year 350,000 people wait on transplants, and each year only 2,000 hearts are available. The AbioCor® could potentially help 100,000 people each year.

The Food and Drug Administration just approved the AbioCor® for HDE- Human Device Exemption, on September 5, 2006. AbioCor® heart can only be transplanted into patients with no other alternative. Robert Tools was the first to receive the artificial heart back in July of 2001. He died November of 2001.

The AbioCor® consists of internal and external components. The internal components are a thoracic unit, which is the pump. The pump weighs around two pounds. This thoracic unit includes the ventricles and the corresponding valves. A motor

driven hydraulic pump is used to move the blood from the right ventricle to the lungs or from the left ventricle to the body. The motor rotates at 4000-8000 RPM (rev. per min.) to create the pressure needed to move the blood. An internal battery acts as an emergency back-up. It can last 20-30 minutes without needing to be reconnected to the main power supply. There is also an internal monitoring system, which controls and monitors the pumps speed.

AbioCor: Representative Anatomic Positions



The external components are battery packs to supply power to the artificial heart. There is a Transcutaneous Energy Transmission (TET) system used to transfer the power to the internal parts. The TET system has internal and external coils which transfer energy through the skin. No tubing or wiring penetrates the skin so risk of infection is decreased.

AbioCor® is made of primarily titanium and Angioflex®. Angioflex® is a product made by Abiomed Inc. and is a type of plastic proven blood safe, flexible, durable, and long lasting. It also helps prevent blood clots and blood cell damage.

Sources:

- [http://www.abiomed.com/news/2006\\_Sep\\_t\\_05\\_FDA.cfm](http://www.abiomed.com/news/2006_Sep_t_05_FDA.cfm)
- <http://www.heartpioneers.com/abioacorfaq.html>
- <Http://www.texasheart.org/Research.devices/abioacor.cfm>