

## **BOTM: October 2006**

### **Pacemaker**

*Image courtesy of Michael J. Lysagh.*



### **Pacemaker (t)**

A **pacemaker** (or "**artificial pacemaker**", so as not to be confused with the heart's natural [pacemaker](#)) is a medical device designed to regulate the beating of the [heart](#). The purpose of an artificial pacemaker is to stimulate the heart when either the heart's native pacemaker is not fast enough or if there are blocks in the heart's electrical conduction system preventing the propagation of electrical impulses from the native pacemaker to the lower chambers of the heart, known as the [ventricles](#). Artificial pacemakers can be used in order to help with and/or treat these conditions:

- [Arrhythmias](#) - an abnormal heartbeat
- [Sick sinus syndrome](#) - when the [sinoatrial node](#) does not fire properly to contract the heart

When first invented, pacemakers controlled only the rate at which the heart's two largest chambers, the [ventricles](#), beat. Many advancements have been made to enhance the control of the pacemaker once implanted. Many of these enhancements have been made possible by the transition to microprocessor controlled pacemakers. Pacemakers that control not only the ventricles but the [atria](#) as well have become common. Pacemakers that control both the atria and ventricles are called dual-chamber pacemakers. Although these dual-chamber models are usually more expensive, timing the contractions of the atria to precede that of the ventricles improves the pumping efficiency of the heart and can be useful in congestive heart failure.

Rate responsive pacing allows the device to sense the physical activity of the patient and respond appropriately by increasing or decreasing the base pacing rate via rate response algorithms. The DAVID trial<sup>4</sup> have shown that unnecessary pacing of the right ventricle can lead to [heart failure](#). New devices can keep the amount of right ventricle pacing to a minimum and thus prevent worsening of the heart disease.

Another advancement in pacemaker technology is left ventricular pacing. A pacemaker wire is placed on the outer surface of the left ventricle, with the goal of more physiological pacing than what is available in standard pacemakers. This extra wire is implanted to improve symptoms in patients with severe heart failure.

More information at: [http://en.wikipedia.org/wiki/Artificial\\_pacemaker](http://en.wikipedia.org/wiki/Artificial_pacemaker)