

## **Elast-Eon**

The Biomaterial of the month is [Elast-Eon®](#), a polyurethane with poly(dimethyl siloxane) soft segment (see Figure1) developed by [AorTech Biomaterials](#) in Australia. St. Jude Medical began marketing this material as [Optim®](#) insulation in its pacemaker and defibrillator leads in 2006.

Polyurethanes (PUs) for medical devices continue to improve. Early PUs with poly(tetramethylene oxide) soft segments were shown to have long-term biostability issues related to both MIO (metal ion oxidation) and ESC (environmental stress cracking)<sup>1, 2</sup>. PUs with aliphatic polycarbonate soft segments, while demonstrating an improvement, did not completely address the long-term biostability issues. Elast-Eon has been engineered with biostable poly(dimethylsiloxane) (PDMS) soft segments which demonstrate the excellent mechanical properties that PUs are known for and have the additional benefit of oxidative and hydrolytic stability<sup>3</sup>.

This polyurethane is currently being marketed as Optim® insulation on pacemaker and defibrillator leads sold world-wide by St. Jude Medical. Pacemakers and defibrillators deliver electrical impulses to heart muscle to regulate the beat, as shown in Figure 2. The leads provide the electrical contact between the pacemaker and the heart muscle tissue. The insulation on the lead needs to be intact for the lifetime of the device, which can be decades, which is why hydrolytic and oxidative stability in the body is essential.

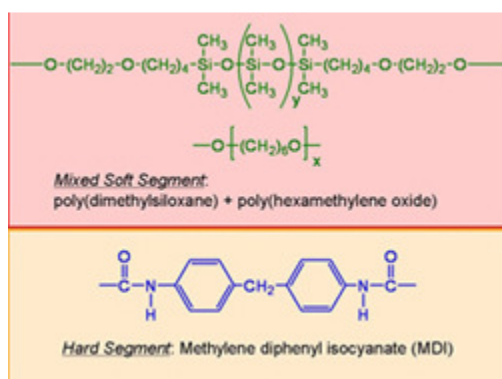
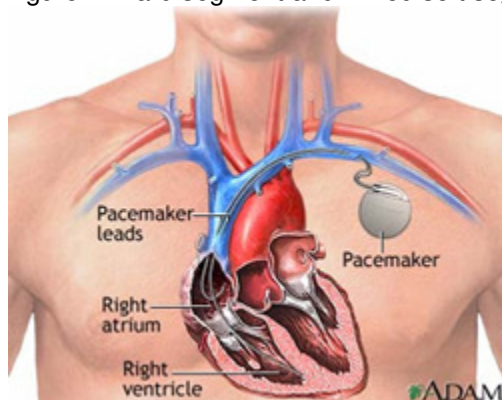


Figure 1. Hard segment and mixed soft segment that comprise the polyurethane.



Source: <http://www.nlm.nih.gov/medlineplus/ency/images/ency/fullsize/19566.jpg>

Figure 2. Illustration showing the pacemaker leads, permanent implants.