

Better Product Knowledge of Biotech Equipment

In the midst of the product development process, the Danish medical device company Biomodics faced a giant challenge: how to make a silicone mixture that would allow antibiotics to seep through. Neutron radiation technology provided the solution, and the result is a type of silicone used in a new generation of high tech catheters that both prevent and treat urinary tract infections.

Biomodics develops hospital equipment, and silicone is one of its most important materials. Essentially, silicone is a soft material for tubes and containers, but when mixed correctly with other substances it will let medicine penetrate its surface.

Development of Groundbreaking Catheters

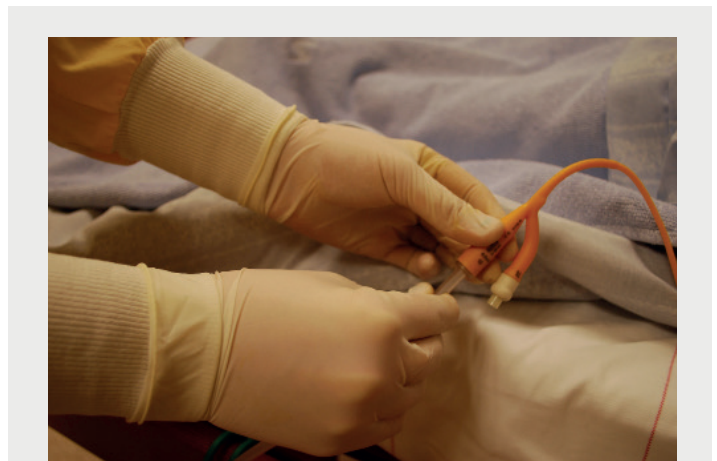
Facilitated by the LINX Association—an innovation platform that brings companies and universities together and helps find funding for short-term development projects—Biomodics developed a project with the University of Copenhagen (KU). The University made use of neutron radiation and “small-angle neutron scattering,” a technique for revealing the structure of materials such as silicone and plastic.

A balloon keeps a catheter in place in the bladder, but almost every patient using a catheter develops a urinary tract infection, which can be very painful. Antibiotics slowly released from the balloon into the bladder could eliminate bacteria causing the infection, so Biomodics wanted to develop a new catheter balloon using its own unique silicone.

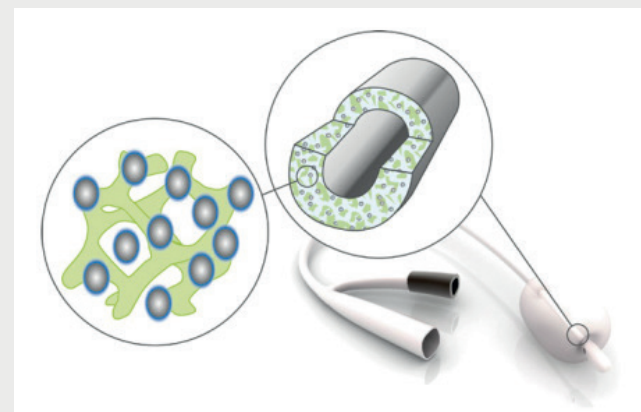
The collaboration with KU allowed Biomodics to answer two fundamental questions: How does each silicone formula affect how antibiotics are released from the balloon? What is the molecular structure of the materials making up the catheters?

With those key questions answered, Biomodics was able to finish development of its groundbreaking catheters and put them on the market. Further questions touched on the company’s future: What would define an even better product? Are we on the right track in our development process? If not, what changes should we make in our direction?

Neutron radiation technology can answer important questions before a company’s product development moves too far in the wrong direction and becomes too costly. As part of an examination of physical products and fluids, it can record images of moving objects – a kind of “live stream” that shows, for example, a material’s microscopic hardening process, or how two materials mix, or how plastic breaks down.



In the future, catheters may be used to locally treat severe infections.



A new kind of catheter that can treat and prevent serious urinary tract infections.

When fluids seep through a product, the process is often invisible to the naked eye. In medical equipment, that seepage may be the controlled release of antibiotics into a human body. Neutron radiation can be used to reveal the process in detail. Using microscopic measurements of molecules, we can examine how effective a product is over time – useful and important data for evaluating cause and effect as well as durability.