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BEYOND MOOSE AND MOUNTAINS: BUILDING CANADA'S BIO-BASED ECONOMY.



Biomedical Polymer Is Proving to be a Powerful Infection Fighter that Protects Patients

Interface Biologics, Toronto, Ontario

Just about everyone on the planet will get a sliver of something in a finger at one time or another. Whether it is wood, metal, plastic or glass, if you don't get it out, it soon becomes a painful mess of infection. Your body is just not meant to have foreign things and bad bacteria inside it. Period.

But what if your life depends on having foreign materials inserted or implanted in your body? Medical devices like urinary catheters, hernia patches and even sutures are critical components to many treatments, yet these essential devices can become ground zero to many infections. Getting through the protective barrier of a human body, especially with devices intended to remain in the body for days at time, increases the risk of infection complications in patients that are already sick.

To combat this source of infection, a Toronto-based company, Interface Biologics, has developed an ingenious method of coating medical devices with infection-fighting medicine that kicks in when the body's own immune system signals that it needs help to fight off bad bacteria.

Called Epidel, it is actually a "biological polymer". With Epidel, the anti-infective drugs are incorporated into the backbone of the polymer, which can then either be spun into fibers – ideal for bandages or hernia patches – or coated onto the area of catheters that penetrate the body. Traditionally, these products, although sterile when inserted, can be the gathering spot for bacteria. It is this bacterial playground called a biofilm, which begins a vicious cycle of infection.

Epidel is unique because the medicine is "embedded in the product itself and it kills the biofilm before it can create a surface that allows other bugs to grow," says Tom Reeves, Interface's president and CEO.

While infections from catheters and hernia patches may only occur in five or six percent of hospital patients, when it does happen it is costly both in terms of pain and finances. It is estimated that patients who acquire infections while in the hospital have to stay in for an extra six days, which could easily add up to another \$30,000 in costs. In Canada, the cost of hospital-acquired infections like those from catheters, reaches almost \$1 billion annually. If the infection is severe enough, patients may have to undergo more surgery to replace the device, which is never good news, says Reeves.



Unlike traditional silver coating, which is a short duration anti-infective agent, Epidel coated devices are capable of delivering infection-fighting medicine for up to 90-days, which makes it unique as well as advantageous to the patient.

The cleverness of Epidel, which will be ready for market in 2011, is that it doesn't just deliver the anti-infective medicine indiscriminately. If there is no infection, the bioresponsive polymer doesn't react, but if the body's immune system recognizes the presence of bad bacteria and releases certain enzymes, the Epidel device immediately begins delivering anti-infective medicine, killing the unwanted biofilm. No biofilm means there is no chance of infection setting in. And that means no nurse is going to be pulling out that catheter any time soon to replace it with a new one.

Interface Biologics also develops biomedical polymers that help prevent thrombosis (blood clots) from developing on or in implantable devices (Endexo), which it will commercialize in 2010. The company also has biomedical polymers that can be used as drug delivery devices (Kinesyx), which are still in early stage development but show great promise with targeted drug delivery or sustained drug release.