Medical Xpress

Anti-inflammatory biomaterial coating prevents rejection of medical implants

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From screws and plates for broken bones to metal hips and dental implants, every day thousands of people undergo surgeries to implant medical devices in the body.

But sometimes their immune systems respond by attacking these foreign objects.

For some patients, this inflammatory response can be controlled by drugs. Others will experience device failure.

But what if there didn't have to be an immune response at all? That's the thinking behind University of Toronto researcher Kyle Battiston and the disruptive new anti-inflammatory product he plans to roll out through a new startup company, KSP2.

A postdoctoral fellow at the Faculty of Dentistry and a recent graduate from U of T's Institute of Biomaterials & Biomedical Engineering (IBBME), Battiston originally designed the anti-inflammatory polymer as a tissue engineering scaffold.

Like climbing plant trainers, these scaffolds allow tissue engineers to grow cells in desired shapes. But fragile cells can react poorly to non-native cellular environments, potentially causing new tissues to fail. With anti-inflammatory scaffolds, the possibility of successfully growing tissue increases.

Battiston and his colleagues quickly saw a global relevance for the biomaterial.

By altering the chemistry of the biomaterial, Battiston and his colleagues were able to coat medical devices with the novel biomaterial – it's made from a family of polymers found to reduce inflammation, specifically when it interacts with white blood cells. The coating actually calms the body's immune response – eliminating the risk of both implant failure as well as the need for anti-inflammatory drugs.

Best of all? It's versatile.

"We've learned this family of materials can retain its anti-inflammatory character while adapting diverse physical properties," he says, allowing Battiston and his new startup team to adapt the material to a wide variety of specific medical uses.

KSP2's first product may be market-ready within the next five years – and Battison expects it will be followed by a host of other health-related applications.

"The first application will be targeted to peripheral nerve stimulation, but we're working on a dental application at the same time," says Battiston, who has recently moved into new lab space at the Ted Rogers Centre for Heart Research in the MaRS building.

"This has turned into a niche technology opportunity that is resonating with more than six groups with diverse end applications that Kyle and his company KSP2 are now talking to," says Professor Paul Santerre, Battison's supervisor, and a key researcher in the newly formed Ted Rogers Centre for Heart Research.

"This [technology] represents an outstanding opportunity that could keep creative and innovative scientists and engineers in the Toronto entrepreneurial ecosystem, and result in international attention and market penetration for leading medical technologies."

Still, despite his product's potential, Battiston didn't always imagine himself an entrepreneur.

"When I started grad school I didn't consider entrepreneurism a thing I would pursue. But seeing Professor Santerre's vision changed that. If you want to make an impact in health care you can't just do research. If you really want to accelerate and bring that technology to market you have to be involved in that process. That's a big part of Dr. Santerre's vision of what students should do."

Provided by University of Toronto