BIODEGRADABLE METALLIC IMPLANTS

BIO-FUNTIONAL COATING FOR BIODEGRADABLE METALLIC IMPLANTS INHIBITS CORROSION AND PREVENTS INFLAMMATION AND INFECTION

TECHNOLOGY FIELD

Biomedical, Healthcare, Human Performance

IP PROTECTION

Patent Pending

RESEARCHER

Anil Mahapatro, Ph.D., is an assistant professor for the Wichita State Department of Biomedical Engineering. His research areas include biomaterials and bioengineering, surface modification of bio-metallic alloys, biodegradable metallic implants, nanotechnology, drug delivery, tissue engineering, design and optimization of bio-devices. He is the co-founder of BDM Biomedical LLC, which works to get biodegradable metallic implants into the market.

BACKGROUND

Commonly used metallic implants include stainless steels, titanium, and cobalt-chromium-based alloys. These biomaterials are limited and can cause negative affects on the body, such as the release of toxic metallic ions and/or particles through corrosion or wear processes, leading to inflammatory issues in patients. Permanent metallic fixtures can trigger infections, increasing the liklihood of repeat surgeries and an increase in healthcare cost. Current metallic biomaterials have vastly different propeties than natural bone tissue, resulting in stress shielding effects that can lead to reduced stimulation of new bone growth and decreased implant stability.

ADVANTAGES

Magnesium (Mg) and its alloys are being explored as a potential biodegradable metallic implant by researchers at Wichita State University. This substance can provide both better physiological repair, as well as superior reconstruction of vascular tissues with minimum inflammatory response. The body's fourth most plentiful metal is magnesium, and some studies have shown that its ions are able to inhibit platelet activation. The corrosion of magnesium-based implants involves the formation of a non-toxic by-products that are harmless to the body.

APPLICATIONS

Wichita State researchers have developed a coating on magnesium to control its biodegradation, surface modification for localized therapeutic delivery, development of in-vitro biodegradation test methods and modeling to predict biodegradation behavior. Their focus on this is to eliminate the concerns of metallic implants by coating each implant in a harmless, biodegradable substance.

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