

Background

Periprosthetic infection is one of the most serious complications in orthopedic surgeries, occurring in 1–4% of primary arthroplasties and up to 30% of revision arthroplasties. Some types of procedures have even higher infection rate.

Peri-implantitis is a serious infection of dental implants with incidence rates of up to 30 % and may cause peri-implant bone loss and implant failure.

The annual cost of infected revisions to US hospitals is projected to exceed \$1.62 billion by 2020. Thus, there is a big need for preventative implants with antimicrobial properties.

Technology

Dr. Jie Song at UMass Medical School has developed a platform polymer coating with vancomycin-bearing and zwitterionic material for metallic implants that exhibit enhanced protection against microbial infections while encouraging osteointegration with the metallic implant surface. This coating acts as a first line of defense against infection and prevents the bacterial biofilm formation.

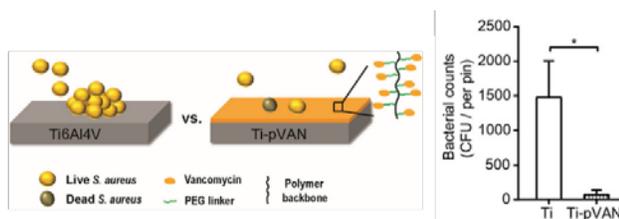


Figure 1: Left: Vancomycin bearing Antimicrobial coatings. Right: Vancomycin coating reduces bacterial adhesion on implant surface

In a number of elegant studies, UMass researchers have shown that the polymer coating facilitate surface biomineralization and significantly inhibit bacterial adhesion in vitro.

Mouse studies further confirmed that vancomycin-modified titanium pins inserted in femoral canals infected with *S. aureus* also significantly suppressed the bacterial colonization on the implant surface compared with those treated with unmodified pins, resulting in significantly mitigated infections/immune responses.

Application

Our antimicrobial/antifouling implant coatings are suitable for:

- Endosteal & subperiosteal dental implants
- Orthopedic implants (Screws, Plates, and Prosthetic implants)
- Cardiac implants
- Neurologic implants

Market Potential

The Global Antibacterial Coatings Market for medical implants is projected to reach \$343.16 million by 2023 from was \$120.22 million in 2016, registering a CAGR of 16.1% from 2017 to 2023.

Salient Features

Anti-fouling yet Osteoconductive nature imparted by zwitterionic branches improve calcium apatite deposition while mitigate bacterial adhesion.

Localized Antimicrobial response by covalent immobilization of vancomycin avoids excessive antibiotic dosing.

Business Opportunity

UMass Office of Technology Management (OTM) is seeking interest from parties for licensing and/or sponsoring collaborative research to develop, evaluate, or commercialize this technology.

Contact

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