Stable Antibacterial Albumin Coating for Medical Devices and Implants

Description:

Healthcare-Associated Infections (HAIs) characterized by antibiotic drug resistance represent a global medical challenge that claims billions of dollars of healthcare expenditure. Procedures using tubes inserted into the body, i.e. catheterization, are two primary causes of HAIs. Presented here is a stable antibacterial coating, for intubation devices and other implants that will prevent HAIs by minimizing bacteria adhesion, biofilm formation, and bacterial antibiotic resistance.

Albumin has long been utilized as a surface coating that prohibits non-specific adsorption of organic materials and microorganisms. However, the success of physically absorbed albumin produced from solution in the prevention of bacterial colonization and biofilm formation has been limited due to the poor stability of albumin at the surfaces. As a result, physically absorbed albumin coatings often fail in in vivo applications. Recently, a novel strategy to derive plasticized coating from albumin has been developed. The coating is resistant to desorption and proteolytic degradation while retaining the ability to prevent bacteria adhesion and biofilm formation. In vivo tests indicate that the albumin plastics are robust and stable for up to four months and are capable of long term, progressive drug, growth factor, or antibacterial agent release.

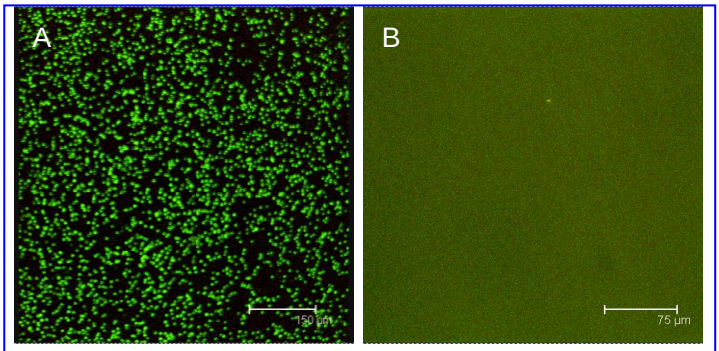

Figure 1: In vitro data on Staphylococcus aureus colonization on implant surface. (A) Lots of live bacteria on titanium implant surface. (B) Almost no bacteria adhesion on human albumin plastic surface.

Applications:

- Anti-bacterial coating for medical devices (catheters, intubation devices, guide wires)
- Coatings featuring slow degrading drug release profile (orthopedic implants, sutures, meshes, stents)

Benefits:

- Robust and stable coating to inhibit bacteria adhesion, colonization and biofilm formation
- Reduce chance of Healthcare-Associated Infections and their associated subsequent costs
- Could mitigate the overuse and abuse of bactericidal agents
- Improves biocompatibility of implanted devices

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