UNIVERSITY OF BIRMINGHAM

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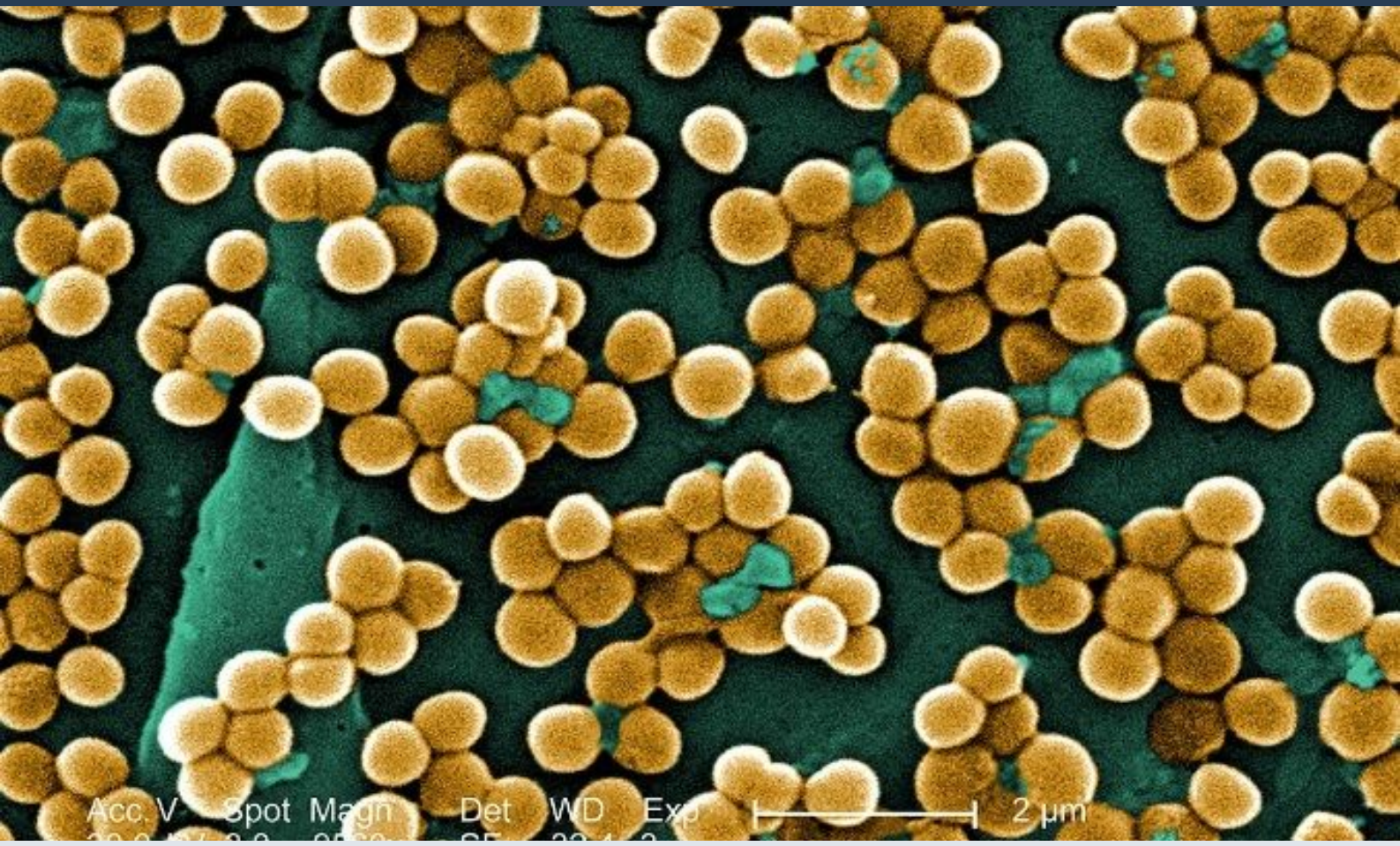
Antimicrobial Peptide Coatings for Reduction of Surface Microbial Contamination

Synthetic antimicrobial peptides with an improved antimicrobial function to their biological counterparts.



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IP Status

Patent application submitted

Seeking

University spin out, Licensing

About **University of Birmingham**

At the University of Birmingham our research leads to new inventions and fuels innovation and business growth.

Background

Surface contaminations can involve the formation of a bacterial biofilm. Biofilms inhibit the penetration of antimicrobial agents and are therefore harder to clear than normal infections. A new method for creating anti-bacterial coatings has been developed using covalent attachment of anti-biofilm peptides to hardened metal surfaces.

Tech Overview

The issue of bacterial biofilms has been addressed by exploiting the function of immune cell-derived antimicrobial peptides which form an important part of the body's innate immune system. Researchers have developed synthetic peptides that have a similar structure to their biological counterparts which have improved antimicrobial function. The antimicrobial peptides are covalently immobilised on nitride metal surfaces, e.g. door handles, worktops and railings, and demonstrate a strong inhibition of biofilm establishment and low development of resistance to the peptide coating.

Further Details:

Surface contaminations often involve the formation of a microbial biofilm. Biofilms inhibit the penetration of antimicrobial agents and, since the cells within the biofilm are relatively quiescent, the antimicrobial effect of such agents is decreased. Silver nanoparticles have been used as surface coatings but these have demonstrated significant human cytotoxicity. The researchers at the university have addressed this issue by exploiting the function of immune cell-derived antimicrobial peptides, which form an important part of the body's innate immune system.

The researchers have developed synthetic peptides that have a similar structure to their biological counterparts, and have improved antimicrobial function. The antimicrobial peptides are covalently immobilised on nitrided metal medical surfaces, e.g. door handles, worktops and railings. Their data indicates a strong inhibition of biofilm establishment and low development of resistance to the peptide coating, indicating the promise of the technology.

Benefits

- Effective prevention of biofilm formation
- Long wearing
- Low development of resistance
- Does not have the toxicity associated with silver nanoparticles

Applications

Anti-bacterial coatings are beneficial in environments such as hospitals, catering establishments and home kitchens. The formation of fouling biofilms by invading microbes is also problematic in a wide range of food industries such as brewing, dairy, poultry and meat processing. Besides causing problems in cleaning and hygiene, biofilms may cause energy losses and blockages in condenser tubes, cooling fill materials, water and wastewater circuits, and heat exchange tubes. Biofilm can also present microbial risks due to the release of pathogens.

Opportunity

The technology is well developed; metal components have been nitrided by a commercial metal finishing company. Peptides have been commercially manufactured. The final dip coating process has been successfully carried out in industrial premises. To reduce the cost of regulatory approval alternative antimicrobial agents have also been successfully attached and tested. Trials have been carried out in the field with test pieces in hospitals and on a naval ship on an 11 month deployment. All test pieces have shown the coating to be effective in preventing the formation of microbial biofilms. Further trials are planned in a hospital and in the University's School of Biosciences.

A spin-out company, NitroPep Limited, has been formed to take the technology to market. The process for obtaining regulatory approval under the Biocidal Products Regulations is underway and expected to be completed for launch of products in early 2018.

An opportunity exists for companies to implement the technology in their products or to licence the technology. The spin-out company is seeking further investment from venture capital or angel investors.

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Patents

- International PCT application PCT/GB2016/052080 published as WO2017/006139