THE UNIVERSITY OF BRITISH COLUMBIA

Universal Antifouling Coating for Medical Implants and Devices

One-step approach to an anti-adhesion coating that prevents bacterial adhesion and thrombus generation, therewith reducing nosocomial infections

Advantages:

- Excellent biofouling resistance
- Biocompatible
- High surface variability
- Applicable for urinary and vascular implants and devices, blood filtration systems, and diagnostic services

Principal Inventor(s):

Professor Jay N. Kizhakkedathu
Department of Pathology

Professor Dirk Lange
Department of Urological Sciences

Publications/References:

Presented at 32nd Meeting of the Canadian Biomaterials Society (CBS) 2015

Patent Status:

Patent filed.

Reference #: 15-170

Contact:

Lynsey Huxham, PhD
Technology Transfer Manager
Tel: (+1) 604-822-5940
Email: lynsey.huxham@uilo.ubc.ca

Technology Details:

Nosocomial infections account for the 4th largest death in developed countries and continues to rise due to the increase in antibiotic resistance bacteria. The FDA has estimated 65-75% of these infections to be caused by bacterial biofilms. The key step in biofilm formation is the adhesion of biological compounds (proteins, electrolytes, peptide, or other organic molecules) to the surface of a medical implant or device forming a conditioning film onto which bacteria can adhere and colonize.

For example, catheter-associated urinary tract infections (CAUTIs) account for a large portion of nosocomial infections. More than 30 million urinary catheters are inserted each year in the United States alone, and the risk for CAUTI increases between 3-10% per day of indwelling time, so after 30 days the risk for CAUTI is already 100%. This is a significant problem for immune compromised patients and chronically catheterized patients. In Canada, CAUTI results in an additional 90,000 hospital days and approximately 6,500 deaths per year. Current antibiotics treatments are often not effective for CAUTI, and there is a significant need for alternative strategies to prevent the incidence of CAUTIs and biofilm associated nosocomial diseases in general.

Researchers at The University of British Columbia have developed a binary universal hydrophilic anti-adhesion coating that is biocompatible and adheres well to a variety of surfaces, such as titanium (Ti), polyethylene (PE), polypropylene (PP), polyurethane (PU), unplasticized polyvinyl chloride (uPVC), and polyimide (PI), while platelets and bacteria did not adhere to it in *in vitro* studies. Furthermore, the coating demonstrated no degradation in physiological solutions over the course of 3 weeks. In preliminary *in vivo* studies, the coating showed superior biofouling resistance towards *Staphylococcus aureus* in a mouse catheter infection model.

Development Stage:

Grant applications for the next development stage are pending. Future studies will focus on the long-time coating stability in biological media and the efficacy of the coating on various medical devices in mice and large animals.

Last Updated: Jan 2016