

Proof of Concept 4 AWARDED JUNE 2021

PROJECT TITLE	PROJECT SUMMARY	UNIVERSITY/ RESEARCH INSTITUTION	COLLABORATOR(S)
An industrial whole organism assay for biofilms made by pathogenic bacteria without the use of laboratory mammals.	Pharmaceutical companies require reliable biofilm assays. Current tests are performed in cultured cells. We will develop colour-based assays to monitor biofilm formation by the pathogen <i>Pseudomonas aeruginosa</i> in the transparent nematode <i>Caenorhabditis elegans</i> . Assays using fluorescent markers and health readouts in this animal will be faster and cheaper than mammals.	University of Kent	Magnitude Biosciences and Perfectus Biomed
Utilising biofilm-driven mineral precipitation for sustainable construction materials and a healthy built environment.	This project will apply a bacteria-based construction technology (BBCT), driven by biofilm-formation, to improve the performance of a new eco-friendly, breathable plasterboard. BBCT can produce limestone films on material surfaces, and here we will use it to modify hemp particles for improved strength when added to the new plasterboard technology.	University of Bath	Adaptavate
Endolysin technology for selective management of MRSA biofilms on skin and wounds.	Antibiotic-resistant bacteria (MRSA) are frequently found on the skin of hospitalised patients, leading to infection and poor wound healing. This project will test whether an enzyme (endolysin) is able to safely and selectively kill skin and wound MRSA without damaging the beneficial skin bacteria.	University of Hull	Cica Biomedical Ltd and Micreos
Targeted Protein Payload Dispersal of Vaginal Biofilms.	Bacterial vaginosis (BV) represents both a significant health and economic burden. Commonly associated with this infection is treatment failure due to the presence of microbial communities known as biofilms. In this project we aim to develop testing platforms to assess the efficacy of a novel therapeutic targeting BV.	Glasgow Caledonian University	CC Bio and University of Glasgow
Assessing the potential of a recombinant anti-biofilm protein as a cost-effective, environmentally-friendly treatment against souring and biocorrosion.	This project investigates the potential of an abundant, naturally-occurring protein, increasingly used in clinical applications, for preventing and controlling industrial biofilms, to reduce problems such as toxic gas production and biocorrosion, and the need for biocides.	Heriot-Watt University	Virustatic
Developing Novel Antimicrobial Surfaces Preventing Biofilms in the Rail and Transport Industry.	NitroPep and the University of Birmingham are developing a novel technology which could prevent bacterial adhesion and biofilm growth on frequent touch surfaces such as those in public transport in trains and buses.	University of Birmingham	NitroPep

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Organo-metallic HIPIMS-coated antibiofilm advanced wound dressings.	This study will explore the application of antibiofilm nanoscale organo-metallic coatings to advanced woundcare dressing substrates using the low environmental impact processes of HIPIMS and aqueous application. This new class of wound dressings would have the potential to greatly enhance patient outcomes and significantly reduce healthcare costs.	Sheffield Hallam University	5D Health Protection Group Ltd
The standard biofilm: A reference measurement system to support routine manipulation, innovation and application.	Methods and materials to support the standardisation of biofilm analysis which are lacking in all industrial sectors where biofilms are important. This project aims to address this need by developing methods to produce and characterise reference materials to validate biofilm analysis and technical approaches used in various industrial sectors.	University of Southampton	LGC Ltd
Novel approach to treat osteomyelitis biofilms combining innovative dual therapy and slow drug release.	Osteomyelitis is a bone disease mostly caused by biofilms in bone injuries or surgical sites sometimes leading to bone removal. We will use a novel approach to treat osteomyelitis biofilms combining innovative dual therapy targeting bacterial communication mechanisms with antibiotics and slow drug release.	University of Nottingham	Ceramisy Ltd and Upperton Pharma Solutions
Evaluating the antimicrobial activity of herbal infusions: implications for consumer healthcare and well-being.	There is an increasing demand for natural supplements in the consumer healthcare and wellbeing market, with more people taking a holistic approach to self-care. Herbal products are widely used in traditional medicines. This study will investigate the antimicrobial effects of Pukka herb products and establish optimal effective combinations.	University of Southampton	Pukka Herbs Ltd
Antibiofilm Touch Point Plastics.	This proposal explores developing plastics on which microorganisms will not grow, either in planktonic or biofilm state. The resultant plastics, processable by typical mass production techniques will enable a huge range of end products across plastics surfaces and touch points.	University of Warwick	5D Health Protection Group Ltd
Development of an <i>in vitro</i> human skin biofilm model for testing active ingredients for hand hygiene.	There is a current need for realistic efficacy assays for screening hand disinfectant products that are simple, affordable and high-throughput. In this project, we will partner with Bear Valley Ventures and Aqualution to develop a human skin biofilm model that can be used for high-throughput testing of skin disinfection formulations.	University of Edinburgh	Bear Valley Ventures and Aqualution Systems Limited

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Bioinspired protein technology for biofilm prevention on indwelling medical devices.	Biofilm formation on indwelling medical devices, such as ventilators or catheters, contributes significantly to the chronicity of infections, posing a substantial healthcare and economic burden. This project will investigate incorporation of natural protein-based technology to indwelling medical devices, and its effectiveness against biofilm formation.	University of Liverpool	Virustatic
Accelerating Innovation By Designing Water Treatment Biofilm Media <i>in silico</i> .	We should design water-treatment biofilms like we design Formula 1 racing cars: in a high-performance computer. From models of individual bacteria, incorporating realistic chemical and mechanical properties, we will show we can design a new generation of treatment biofilm media <i>in silico</i> .	Newcastle University	Veolia Water Technologies and Northumbrian Water Ltd
Development of novel biomimetic surfaces to prevent biofilm formation on catheters.	This project aims to develop novel biomimetic antibiofilm surfaces for catheters without using antibiotics or other antimicrobial agents. This would address catheter associated biofilm infections with the aim of improving development of anti-fouling surfaces to prevent biofilm formation in the long-term.	Newcastle University	Teleflex Medical Europe Ltd and University of Southampton
Development of an electrospun antimicrobial coated tampon for management of bacterial vaginosis.	Bacterial vaginosis (BV) affects women aged 15-44yrs but is difficult to treat during menstruation. This project will engineer a tampon with unique additional layers containing a smart antimicrobial protein that is released during use to manage the bacteria that cause disruption to the normal biofilm of the vagina causing BV.	University of Bradford	Virustatic
Rapid Easy-to-use and Affordable Diagnostics for Wound - 2.	A point-of-care wound diagnostic test under development will be validated for rapid quantitative detection of bacterial load and antimicrobial sensitivity using clinical isolates of a range of wound relevant bacterial strains and wound samples. Successful validation will be progressed towards further optimization and clinical trial supported by an external grant.	Loughborough University	Smith and Nephew Limited, Birmingham City University, Lancaster University and Cromerix Ltd
To incorporate a quorum sensing blocker (lactams) into topical treatments to control mixed biofilms on keratinaceous infections.	The general aim of this proof of concept study is to develop and evaluate a pioneering topical skin treatment to be used as a new smart technology for the effective management of complex biofilm infections. This has the potential as an alternative for anti-microbial resistant infections and reduce healthcare costs.	University of Glasgow	Unilever and Penrhos Bio