I&I NETWORK NEWSLETTER

University of BRISTOL
Elizabeth Blackwell Institute for Health Research

INFECTION & IMMUNITY

2023 - ISSUE 1

GW4 leads international AMR project

A GW4 led international antimicrobial resistance (AMR) research community has been awarded £50,000 by the global co-ordinator the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) to investigate the spread of antimicrobial resistance by exploring how the resistance genes spread on plasmids.

This collaborative network, called *Tools for the Epidemiology of AMR Plasmids, One-Health Transmission and Surveillance (TEAPOTS)*, brings together experts from different disciplines with research expertise that addresses different aspects of this complex problem, and aims to establish generic standards and tools for AMR plasmid epidemiology and enhanced surveillance. The award builds on the recent GW4 Generator Award

GW4 AMR ANTIMICROBIAL RESISTANCE ALLIANCE

funding awarded to the GW4 AMR Plasmid Epidemiology and Surveillance collaborative research and innovation community and the application was supported by the GW4 AMR Alliance – a One Health AMR research consortium at the GW4 universities of Bath, Bristol, Cardiff and Exeter to tackle the global threat of antimicrobial resistance.

The network is led by Professor Ed Feil from the University of Bath and current chair of the GW4 AMR Alliance Steering Group. The project consists of 24 researchers in total from ten different countries, including GW4 colleagues from Bristol and Bath.

Other members of the GW4 AMR Alliance steering group include Prof Matthew Avison (Cellular and Molecular Medicine), Prof Kristen Reyher (Bristol Veterinary School) and Prof Helen Lambert (Bristol Medical School) at the University of Bristol.

Inside this issue:

EVENTS

Researcher coffee morning: inflammatory bowel disease
16 March 2023, 10.00 - 11.00, Dr Jennifer Phillips, online

Challenges and Advances of Deep Learning in Digital Pathology
16 March 2023, 13.00 - 14.00, Dr Nikolay Burlutskiy (Director of Artificial Intelligence, AstraZeneca R&D), online

The Importance of Vaccine Research
16 March 2023, 17.30 - 19.00, online

Power and Privilege in Academia
21 March 2023, 16.00 - 18.00, online

NIHR Grant Applications Seminar
22 March 2023, 10.00 - 12.30, online

Climate Change and Health Symposium
21 June 2023. Chemistry Building
An inclusive and collaborative exploration of the wider effects of climate change on health, including engineering interventions, modelling of disease transmission, impacts on nutrition and food systems, entomology, fungal pathogens, and mental health consequences.
Poster submission deadline: 17 May 2023

MORE INFORMATION AND TO REGISTER
ALL WELCOME

Working towards a Fellowship (Health and Life Sciences, University of Bristol only)
23 March 2023, 10.00 - 11.30, online

Sustainable food systems in the face of global human-made catastrophes
23 - 24 March 2023, Public lecture: Sir Charles Godfray (Professor of Population Biology and Director of the Oxford Martin School), Wills Hall Conference Centre, Stoke Bishop, BS9 1AE

Qualitative research in MSM in Singapore – from LSHTM to the present
23 March 2023, 13.00 - 13.50, Dr Martin Chio (Senior Consultant Dermatologist, National Skin Centre Singapore), LSHTM, Keppel Street, London WC1E 7HT and online

The effect of autoimmune disease risk alleles on molecular T cell traits
23 March 2023, 13.00 - 14.00, Soumya Raychaudhuri (Professor of Medicine and Biomedical Informatics, Harvard Medical School), online

Could Uncertainty Quantification be useful during the next pandemic?
29 March 2023, 13.00 - 14.00, Daniel Williamson (University of Bristol), Fry Bldg room 2.41

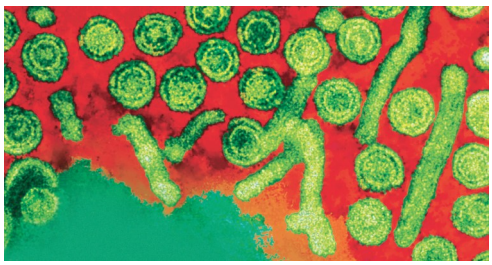
VIEW THE FULL LIST OF I&I EVENTS ON OUR WEBSITE

NEWS

Rapid tests make diagnosis of Hepatitis C more accessible

A study has shown the benefit of using a quick clinic-based diagnostic test for hepatitis C virus (HCV) infection over a standard laboratory-based test. The findings from the study have led to World Health Organization (WHO) guidelines recommending the adoption of the point-of-care (POC) HCV test which will speed up the treatment cycle for the infection. Overall uptake of treatment was higher with POC tests at the clinic site (77%) or delivered in mobile units (81%) compared with standard laboratory-based tests (53%).

This recommendation complements other recent WHO

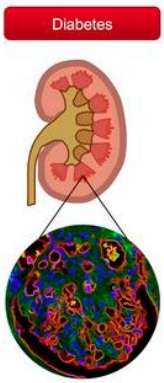


recommendations in the same updated guidance for HCV diagnosis and treatment that promotes radical simplification of service delivery and task-sharing of testing and treatment to nurses and non-specialist doctors. WHO is now undertaking a similar evaluation of point-of-care viral load assays for hepatitis B in its planned 2023 updated guidance.

Trickey A *et al*. (2023). Impact of hepatitis C virus point-of-care RNA viral load testing compared with laboratory-based testing on uptake of RNA testing and treatment, and turnaround times: a systematic review and meta-analysis. *The Lancet Gastroenterology and Hepatology.*

Reducing the progression of diabetic kidney disease

A new way to reduce progression of diabetic kidney disease, affecting 40% of people with diabetes, has been discovered. Recent clinical trials show a commonly used blood pressure medicine, known as spironolactone, is an effective treatment by reducing protein leak into the urine. However, despite its positive effect, the drug can have adverse side effects, causing problems including high blood potassium levels (hyperkalaemia) in patients, making clinicians reluctant to use it.



Researchers from Bristol Medical School, in collaboration with international colleagues, aimed to understand how spironolactone prevents damage to the kidneys.

They found that the drug has a protective effect by helping preserve the gel-like glycocalyx layer on the surface of blood vessels within the kidney. Using novel alternative therapeutics to slow down glycocalyx layer degradation in diabetes directly could now help them recreate the same effect but without adverse side effects.

Butler MJ *et al*. (2023). Mineralocorticoid receptor antagonism in diabetes reduces albuminuria by preserving the glomerular endothelial glycocalyx. *JCI Insight.*

Best presentation award

Dr Johara Stringari, Research Associate in the School of Biochemistry, won the 'Best Oral Communication Award' for her presentation about ADDovenom at the 28th Meeting on Toxinology of the French Society of Toxinology, held in Paris on 28-29 November 2022.

Her talk was entitled *Snake venom proteins vs ADDobodies: Antigen production for ribosome display.*

ADDovenom is a European Research Council funded project which uses an innovative platform to produce snakebite treatments quickly and affordably. Based on the AD-Domer protein-based nano-scaffold developed by University of Bristol spin-out company Imophoron, co-founded by entrepreneur and inventor Frederic Garzoni and Professor of Biochemistry Imre Berger at the University of Bristol, ADDovenom combines pioneering proteomics, transcriptomics and bioinformatics focusing on snake toxins provoking the most challenging syndromes like haemorrhage and paralysis. The aim is to develop first-in-class neutralising superbinders for snakebite therapy of unprecedented efficacy against the most prevalent Sub-Saharan snakes.

Omicron-related hospitalisations

Two studies have provided data on severity and hospitalisation from Omicron-related SARS-CoV-2 infection.

The first demonstrated that Omicron infection resulted in less serious outcomes than Delta in hospitalised patients. Compared to Delta, Omicron-related SARS-CoV-2 hospitalisations were 58% less likely to need a high level of oxygen support, 67% less likely to need ventilatory support (such as a ventilator) or more critical care, and 16% less likely to have a hospital admission which lasted for more than three days. The research team suggest there should be ongoing evaluation of the severity of new variants of SARS-CoV-2, along with careful planning of healthcare resource to avoid healthcare systems being overwhelmed.

The second showed that receipt of two-doses of Pfizer-BioNTech vaccine may result in an 83% reduction in the rate of hospitalisation due to Delta SARS-CoV-2 infection, compared to the unvaccinated. Two doses also prevented severe in-hospital outcomes due to Delta SARS-CoV-2 infection, reducing the likelihood of a hospital admission lasting more than three days by 63%. They also found that two doses of the vaccine reduced the risk of a patient needing increased oxygen or ventilatory support by 52% and 59%, respectively.

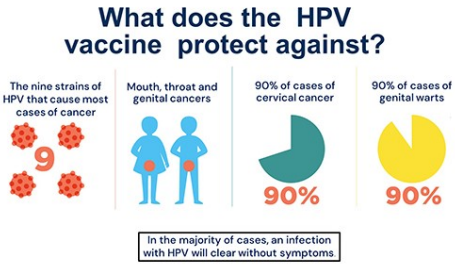
Hyams C *et al*. (2022). Severity of Omicron (B.1.1.529) and Delta (B.1.617.2) SARS-CoV-2 infection... *The Lancet Regional Health*.

Chatzilena A *et al*. (2022). Effectiveness of BNT162b2 COVID-19 vaccination in prevention of hospitalisations... *The Lancet Regional Health - Europe.*

Lesson about HPV vaccines awarded quality mark

A lesson to help teenagers find out about the human papillomavirus (HPV) vaccine in schools has been awarded the Personal, Social, Health and Economic (PSHE) education Association quality mark. HPV is a common infection that is spread by skin-to-skin contact, including sexual contact. Since the pandemic there has been a decline in the uptake of the HPV vaccine – down nationally from 86% to 69%.

EDUCATE, co-produced by young people and researchers from the University of Bristol and London School of Hygiene and Tropical Medicine, will help professionals inform Key Stage 3 students about the HPV vaccine and provide reassurance about receiving the vaccine — which is usually offered to teenagers at school as part of the national vaccination programme. The resources for the EDUCATE lesson include films and exercises to assist learning, along with supporting the delivery of the HPV vaccination programme by providing young people with information and answering questions they may have.



The vaccine helps prevent infection with the strains of HPV that are responsible for causing the majority of HPV-related cancers in both women and men. These include cancers affecting the cervix, vulva, vagina, penis, anus, mouth and throat. The HPV vaccine also provides protection against genital warts.

Funding successes: Part 1

Dr Katharine Looker (Bristol Medical School) received £102,093 from the **National Institute for Health and Care Research** (NIHR) for *SARS-CoV-2-attributable long-term outcomes in children in England: analysis of linked school survey data and electronic health record data*, starting April 2023 for 14 months.

Langford Trust awarded Prof Linda Wooldridge (Bristol Veterinary School) £117, 009 for her project *Identifying the cause of meningoencephalitis of unknown origin (MUO) in dogs to improve clinical management*, starting Apr 2023 until Sep 2026.

Prof Wooldridge has also been awarded £8,517 from the **Wellcome Trust** for *Targeting CD8 using "blocking anti-CD8 antibodies" as a strategy to disable autoreactive CD8+ T-cells in Type 1 diabetes*, Jan-June 2023.

Innovating behaviour and health surveillance for cardiovascular disease prevention in Malaysia has been supported by a £25,084 grant from the Medical Research Council. Dr Miranda Armstrong (Policy Studies) started the project in Jan 2023 and is expected to complete in March 2023.

Dr Catherine Dodds (Polioy Studies) was awarded £13,670 from **Research England**'s Participatory Research Fund for Community Auditing of Risk Assessments (CARA): updating blood borne virus policy & practice in local institutions, Feb-July 2023.

Prof Ruth Massey (Cellular and Molecular Medicine) received £125,000 from an internal **University of Bristol** scheme for *Human and Bovine TB diagnostics*, Feb '23 for one year.

Researching the history of antibiotics in primary care

The prevalence of antibiotic use in modern society is well established. Antibiotics have revolutionised medicine and how society sees - and deals with - disease. Along with concerns regarding the rise of antibiotic resistant bacteria, thought to be exacerbated by their over-use in many areas, there is a need to understand the history of their adoption and use, especially in primary care. Comprehending the many-tendrilled circumstances and behaviours that led to this point might help to inform future choices, and give some insight into future best practice.

Dr Barbara Caddick (pictured), Senior Research Associate at the Centre for Academic Primary Care (CAPC), is a member of its 'infections and antibiotics' and 'medicines and prescribing' research groups. Her interest in the project has been supported by a number of funding awards from the Brigstow Institute, the Elizabeth Blackwell Institute's Medical Humanities strand and the Jean Golding institute seed-corn fund. Dr Caddick is now one of 30 researchers who have been selected to take part in the GW4 Alliance Crucible, a programme designed to enhance collaborative research leadership using hands-on training and coaching. This year's theme is 'Our data and digital world - opportunities for transformative interdisciplinarity'. **Read more**

Stem cell plasters to reduce surgeries

Researchers at the University of Bristol, funded by the British Heart Foundation (BHF), have developed 'stem cell plasters' to revolutionise the way surgeons treat children living with congenital heart disease, so they don't need as many open-heart operations.

Currently surgeons can perform open-heart surgery to temporarily repair heart defects, but the materials used for the patches or replacement heart valves are not completely biological and cannot grow with the baby. BHF Professor Massimo Caputo has developed the first type of stem cell patch to repair abnormalities to the valve in the large blood vessel that controls blood flow from the heart to the lungs, and to mend holes between the two main pumping chambers of the heart. The stem cell plasters are designed to be sewn into the area of the child's heart that needs repairing during surgery. The stem cells could then boost the repair of heart tissue without being rejected by the child's body.

These patches have the potential to adapt and grow with the child's heart as they get older, removing the need for repetitive heart surgeries.

Read the patients' stories on the University of Bristol's press release

Image © BHF
New stem cell plaster (left) and the original surgical material (right)

Accelerating impact through commercialisation

Two Bristol Veterinary School academics will accelerate the impact of their research through commercialisation. Prof Andrew Dowsey and Dr Laszlo Talas have been awarded 2 of 8 University Enterprise Fellowships offered in the 2022/23 round which will facilitate them to bring their research to life through enterprise development over 12 months. The financial support is intended to support a reduction in other duties during that period as well as costs such as travel or meetings directly associated with the fellowship.

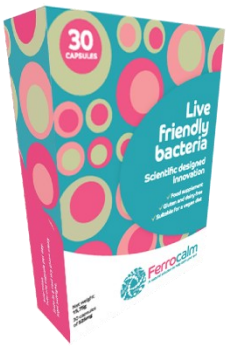
Prof Dowsey (pictured left) will translate his data science research into real-world impact in healthcare. This will be explored in the context of novel diagnostics for resistant bacterial infections. Potential impacts include:

- Bringing forward diagnosis of antimicrobial resistance by a day
- Significantly aiding prescribing for time-critical infections such as sepsis
- Preserving the effectiveness of antibiotics for the population at large

Dr Talas (pictured right) will develop an automated tracking and behaviour classification system for horses. It is an exciting technology that could have major impact in the field of equine health, and could also be applied in many other veterinary settings to track animal health and disease and provide timely interventions.

Gut calming innovation for IBS sufferers

The discovery of a strain of bacteria shown to reduce inflammation in the intestine caused by irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) could bring relief to millions of sufferers after being turned into an innovative natural food supplement by University of Bristol biotech spin-out Ferryx.



Treatment options for individuals with IBS and IBD are limited and while probiotics are popular, there are currently no conventional probiotics that can function to alleviate symptoms during active flare-ups or if someone is stressed.

The discovery of FX856, a friendly strain of live bacteria, which has shown in animal models with inflammatory bowel disease to survive and thrive during periods of active inflammation delaying disease onset and reducing symptoms, led the Bristol team to create Ferrocalm.

The gut-calming solution, developed over 10 years' R&D at the University of Bristol, contains FX856 and aims to reduce symptoms such as stomach cramps, bloating, diarrhoea and constipation that people suffer during active flare-ups of IBS, IBD and Crohn's and ulcerative colitis. Currently approved for use as a food supplement, Ferrocalm will undergo clinical trials in patients with inflammatory bowel disease in 2024 to test efficacy as a pharmaceutical treatment.

Image © Ferryx

The Group A strep crisis: Can we do better?

Group A Streptococus (GAS) is a bacterium found in the throat and on the skin which can cause both scarlet fever and strep throat. It can be spread between people through sneezing, kissing and skin contact. Most GAS infections are relatively mild; however, on rare occasions they may cause severe or life-threatening diseases, such as Invasive GAS (iGAS), which occurs when bacteria get past the defences of the person who is infected.

Prof Alastair Hay wrote a piece in the *British Medical Journal* (BMJ) which explained that well-intentioned messaging may have harmed public health by marking the detection of unwell children harder. He used the example of the UK Health Security Agency's guide on identifying the symptoms of scarlet fever and the late stages of strep A infection, advising parents to contact NHS 111 or their GP if their child seemed "seriously unwell". This resulted in a overwhelming increase in demand on primary care services, call lines and emergency departments, with some reports of requests for care from parents of mildly unwell or even entirely well children. Meanwhile the media splashed stories of children falling ill and dying from iGAS infection.

Prof Hay suggested three aspects of the messaging could be improved.

Hay, A (2023). *The BMJ*.

Funding successes: Part 2

Dr Isabel Murillo (Cellular and Molecular Medicine), in collaboration with Carmen Meira Garcia (Education), has been granted funds by the **Microbiology Society** to perform an outreach project that integrates the disciplines of foreign languages and microbiology. The project is titled *"Los Microbios que viven en tu escuela"/"The microbes that live in your school".*

Prof Mick Bailey has received an **International Veterinary Vaccinology Network** (IVVN) Laboratory Exchange Award of £6,500.

GlaxoSmithKline has set up a collaborative research contract with Prof Nicola West (Bristol Dental School) for *Haleon 1 bicarbonate gingivitis study - clinical study*, £567,470, starting Jan 2023 for one year.

Dr Venexia Walker (Bristol Medical School) was awarded £34,242 from the **National Institute for Health and Care Research** for Risk factors for winter infections, Jan-Mar2023.

A **Biotechnology and Biological Sciences Research Council** Impact Accelerator Award of £19,889 went to Dr Laura Rivino (Cellular and Molecular Medicine) for *The Mechanisms of Natural Killer (NK) cell function*, Jan-Mar 2023.

The **Jean Golding Institute** seed corn fund 2022-23 has supported a collaborative project between Dr Siôn Bayliss (Bristol Veterinary School) and Dr Daniel Lawson (Mathematics) £4,501 for *Assessing the recombinogenic potential of novel bacterial lineages*. The study will apply innovating methodologies to assess the potential for newly identified bacterial lineages to uptake foreign DNA, and increase their potential to become the problem pathogens of the future.

Black Death helps protect against disease

The same genetics that helped some of our ancestors fight the plague is still likely to be at work in our bodies today, potentially providing some of the population with extra protection against respiratory diseases such as COVID-19.

A collaboration between the Universities of Bristol, Edinburgh, Oxford, Cardiff and Imperial College London, reveal that the same variants are present in humans today and providing similar protection against not only bubonic plagues but also other infections. However, this is a situation of balance, and the same genetic makeup is likely to be linked with increases in various autoimmune diseases

such as rheumatoid arthritis and inflammatory bowel disease.

They looked at infection, autoimmune disease, and parental longevity across participants in three large contemporary genetic studies (UK Biobank, FinnGen and GenOMICC). They used Mendelian randomisation to find associations between variation in the ERAP2 gene and risk of autoimmune disease and infection. Their findings point to antagonistic effects across these two groups of diseases driven by pressures likely to be more or less present in different human eras.

Hamilton F *et al*. (2023). Variation in ERAP2 has opposing effects on severe respiratory infection and autoimmune disease. *The American Journal of Human Genetics*.

Funding successes: Part 3

Dr Ben Baker (Chemistry) received a £14,657 Impact Accelerator Award from the **Engineering and Physical Sciences Research Council** for *Bioglass; Antimicrobial Amino Acids*, Jan-Dec 2023.

Dr Nina Ockendon-Powell (Biological Sciences) was awarded £25,813 from the **Natural Environment Research Council** for Towards understanding and management of vector-borne plant virus impacts on nutrition in a changing climate, Dec 2022-March 2023.

Prof Matthew Ridd (Bristol Medical School) received £11,839 from the **National Institute for Health and Care Research** (NIHR) School for Primary Care Research for COVID and skin (CPRD study, from July 2023 for two years.

STanding blood pressure and its AssociatioN with cardiovascular Disease and aDverse events is being led by Dr Rachel Johnson (Bristol Medical School) thanks to a £41,207 award from the **NIHR** School for Primary Care Research, from June 2023 for two years.

Dr Sarah Smith (Bristol Medical School) was awarded a **British Heart Foundation** research grant of £193,000 for a project entitled *Validation of novel LincRNAs with preventative roles in adverse cardiac fibrosis*. The project aims to elucidate the specific roles of two LincRNAs that promote cardio-protective effects in the heart. Specifically, novel mechanisms influencing myocardial fibrosis, both common and distinct in major cardiac cell types, will be investigated.

Assessing wounds after surgery

Bristol Biomedical Research Centre researchers have developed and tested a method for patients to take and submit wound images after surgery so they can be assessed remotely for wound infection. Patients were able to successfully produce high-quality images after the study team provided them with instructions on how to take and transmit them.

Surgical site infections (SSI) are one of the most common adverse events after surgery. Assessing potential SSIs can be difficult when patients only stay in hospital for short periods of time, as they often develop after a patient has been discharged.

The study team drafted step-by-step instructions for patients on how to take photos with smartphones or mobile devices, using plain language, and making sure that instructions met clinical and practical requirements for photographing wounds. They tested and revised the instructions and image submission process by conducting in-person interviews with patients who had recently undergone surgery, followed by remote testing with another set of patients who had been discharged from hospital.

Macefield RC *et al*. (2023). Remote assessment of surgical site infection (SSI) using patient-taken wound images: Development and evaluation of a method for research and routine practice. *Journal of Tissue Viability*.

Treating sepsis-associated acute kidney injury

Dr Raina Ramnath (Bristol Medical School, pictured)) has been awarded three-year British Heart Foundation (BHF) funding, starting January 2023, to understand the causal relationship between vascular endothelial glycocalyx damage and acute kidney injury in sepsis.

Sepsis remains the leading cause of acute kidney injury (AKI), found in 40-50% of patients with AKI in intensive care units. Sepsis-AKI is associated with a high mortality rate of 41%. The renal microcirculation is profoundly disturbed in sepsis-AKI, leading to kidney damage. The glycocalyx is a protective layer found on the inner lining of all the blood vessels in the body, including the kidney. Loss of the glycocalyx has been associated with vascular and kidney injury.

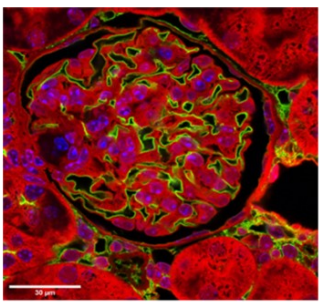


Fig 1. The glycocalyx stained green with lectin LEL can be seen lining the capillaries in the glomerulus. The membrane is stained red with R18.

The vascular endothelial glycocalyx damage offers a novel therapeutic target in the treatment of sepsis-AKI. This study supports repurposing clinically available drugs with MMP9 inhibition properties e.g. tetracyclines in vascular dysfunction in sepsis-AKI. This promises a rapid way to translate preclinical work on endothelial glycocalyx protection to clinical application. This will be of benefit to sepsis-AKI by decreasing mortality in patients, and providing a wider health impact, by ameliorating systemic vascular diseases.

FUNDING OPPORTUNITIES

Research Professional provides access to an extensive database of funding opportunities. UoB staff and students have **FREE** online access to the database from any device – once you've registered then you can view upcoming funding opportunities from any device. You can search for funding information by discipline, sponsor, database searches, by recent calls or by upcoming deadlines. If you register for the site and log in, you'll be able to:

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- Sign up for higher education news bulletins

For further information on Research Professional, go to the RED website.

Research Professional

Global Polio Eradication Initiative
Call for proposals for polio eradication

Closing date: 4 April 2023 Award amount: €300,000

This supports research projects contributing to the Polio Endgame Strategy 2022-2026. The current priority is to generate new data or information in the following areas: vaccine schedule immunogenicity; surveillance; product development; epidemiology or virology; monitoring and evaluation; basic immunology; containment.

Wellcome Trust
Generating evidence for decision-making on the use of the oral cholera vaccine

Closing date: 21 April 2023 Award amount: €300,000

Successful teams will support and engage with policymakers and/or implementing partners who are responsible for preventing and controlling cholera. This funding call aims to generate more evidence on three prioritised and connected areas: defining hotspots to help target OCV campaigns; the impact of different OCV dosing schedules: one dose, two dose and different dose intervals; and the subsequent duration of protection provided according to age and pre-existing immunity.

European Society for Immunodeficiencies
Medium-term fellowships

Closing date: 24 April 2023 Award amount: €6,500

These support physicians or scientists in specialist training who are interested in pursuing a research project in the field of primary immunodeficiencies.

Medical Research Foundation
Emerging leaders prize

Closing date: 25 April 2023 Award amount: £100,000

This Prize is intended to celebrate the achievements of outstanding researchers who are making an impact in viral and/or autoimmune hepatitis research and have demonstrated their potential to be a research leader of the future.
This could include but is not limited to:

- significant understanding of the disease mechanisms underpinning viral and/or autoimmune hepatitis
- better diagnosis, treatment or modification of the progression and outcomes of these diseases

Medical Research Council
Research grants - infections and immunity

Closing date: 10 May 2023 Award amount: £unspecified

These fund focused research projects that may be short- or long-term in nature related to infections and immunity, as well as method development and continuation of research facilities.

Pediatric Infectious Diseases Society
Pichichero Family Foundation Research Development, Vaccines for Children Initiative Award in Pediatric Infectious Diseases

Closing date: 15 July 2023 Award amount: USD $100,000

The award is intended to support translational and clinical research involving vaccine development and/or pathogenesis or host-pathogen interaction moves the field towards the development of new vaccines and therapeutics. Preference will be made for studies that advance new knowledge, new insights into vaccine and immunotherapeutic development, pathogenesis and host-pathogen interactions.

Healthcare Infection Society
Graham Ayliffe training fellowship

Closing date: 1 September 2023 Award amount: £73,000

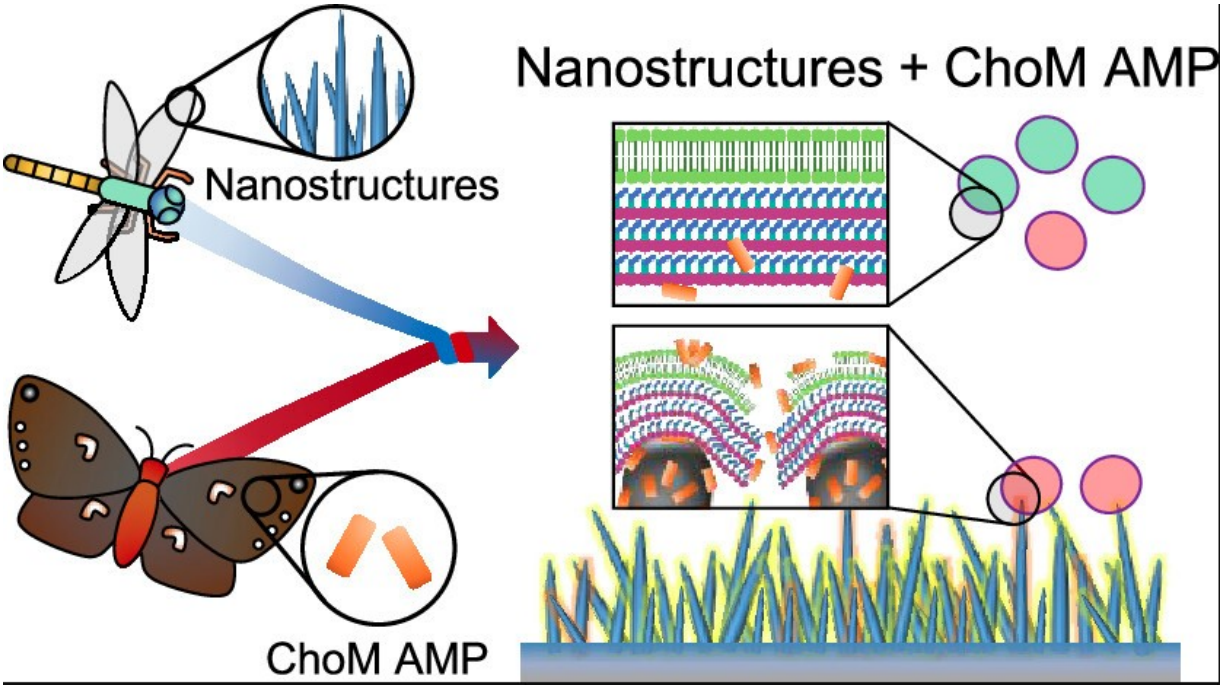
This enables clinicians working in the field of infection prevention and control to take a one year paid leave of absence to pursue their specialist area by broadening their knowledge base and imparting that knowledge to the wider scientific and medical community.

THIS ISSUE'S FEATURED ARTICLE

Enhanced and stem-cell-compatible effects of nature-inspired antimicrobial nanotopography and antimicrobial peptides to combat implant-associated infection

Ishak MI, Eales M, Damiati L, Liu X, Jenkins J, Dalby MJ, Nobbs AH, Ryadnov MG & Su B (2023). *ACS Applied Nanomaterials*.

Nature-inspired antimicrobial surfaces and antimicrobial peptides (AMPs) have emerged as promising strategies to combat implant-associated infections. In this study, a bioinspired antimicrobial peptide was functionalised onto a nanospike (NS) surface by physical adsorption with the aim that its gradual release into the local environment would enhance inhibition of bacterial growth. Peptide adsorbed on a control flat surface exhibited different release kinetics compared to the nanotopography, but both surfaces showed excellent antibacterial properties. Functionalisation with peptide at micromolar concentrations inhibited *Escherichia coli* growth on the flat surface, *Staphylococcus aureus* growth on the NS surface, and *Staphylococcus epidermidis* growth on both the flat and NS



surfaces. Based on these data, we propose an enhanced antibacterial mechanism whereby AMPs can render bacterial cell membranes more susceptible to nanospikes, and the membrane deformation induced by nanospikes can increase the surface area for AMPs membrane insertion. Combined, these effects enhance bactericidal activity. Since functionalised nanostructures are highly biocompatible with stem cells, they make promising candidates for next generation antibacterial implant surfaces.

CONTACTS

The Infection and Immunity Network is run by a Steering Group:

Co-Chair (non-clinical): Angela Nobbs - Senior Lecturer in Oral Microbiology
Co-Chairs (clinical): Julia Colston - Consultant in Infection
Ed Moran - Consultant in Infectious Diseases

- Borko Amulic - Senior Research Fellow in Immunology
- Matthew Avison - Professor of Molecular Bacteriology
- Charles Beck - Consultant Epidemiologist & Head of Team, Field Service South West, National Infection Service, UK Health Security Agency
- Philip Bright - Clinical Immunologist, North Bristol NHS Trust
- Stephanie Diezmann - Senior Lecturer in Fungal Pathogens
- Hannah Fraser - Research Fellow in Infectious Disease Mathematical Modelling
- Clare French - Research Fellow in Research Synthesis
- Anu Goenka - Clinical Lecturer in Paediatric Infectious Diseases and Immunology
- Melanie Hezzell - Associate Professor in Cardiology
- Anna Long - Senior Research Associate (Diabetes UK RD Lawrence Fellow)
- Jamie Mann - Senior Lecturer in Vaccinology & Immunotherapy
- Adrian Mulholland - Professor of Chemistry
- Laura Peachey - Lecturer in Veterinary Parasitology
- Annela Seddon - Director of the Bristol Centre for Functional Nanomaterials
- Luca Shytaj - Lecturer in Virology
- Sandra Spencer - Research Development Associate for the Faculty of Life Sciences
- Peter Vickerman - Professor of Infectious Disease Modelling
- Richard Wall - Professor of Zoology
- Catherine Brown - Network Administrator

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