I&I NETWORK NEWSLETTER

University of BRISTOL
Elizabeth Blackwell Institute for Health Research

MARCH – APRIL 2019

The Truth About... Antibiotics

Dr Paul Race (Biochemistry) made a BBC television appearance with Angela Rippon discussing his work on new antibiotics from sponge bacteria living at the ocean floor.

Aired on 14 February 2019, the programme followed Angela as she discovered just where scientists were looking in a bid to find new ways to combat bacterial infections, including wild alligators and a sewage works. The show revealed how a growing number of bacterial diseases are becoming resistant to the antibiotics currently in use, and how the problem is escalating on a global scale. The audience learned about several of the latest scientific breakthroughs, how GP practices are changing to help tackle the issue, and how the general public can contribute to the effort to keep the miracle cure effective.

INFECTION & IMMUNITY

UoBRISTOL EVENTS

Community Event: Academic Journeys
4 April 2019, 14.00 - 16.00, Room 4.10, School of Education,35 Berkeley Square

Overcoming imposter syndrome and finding your academic voice
10 April 2019, 12.00 - 13.00, Ema Swingwood (Respiratory Pathway Lead/Physiotherapist, UHBristol), Lecture room 3, Education & Research Centre, Upper Maudlin Street

Considering the impact of your research: A Hero's Journey to research narrative
10 April 2019, 12.30 - 14.00, Verdon Smith Room, First Floor, Royal Fort House

Faculty of Life Sciences microscopy facilities open afternoon
10 April 2019, 14.00 - 17.00

GW4 Developing your DTE event - Equality, Diversity and Inclusion
17 April 2019, 10.00 - 16.00, Waterside 2, The Watershed

Statistics Clinic
17 April 2019, 14.00 - 15.30, SM2 Mathematics Building

T3 Technical Talk Time Seminar series
17 April 2019, 14.00 - 15.00

Data Visualisation Working Group
18 April 2019, 12.30 - 13.30, Room G1, 7 Priory Road, University of Bristol, BS8 1TZ

Introduction to Economic Evaluation
24 - 26 April 2019, Bristol Medical School, Canynge Hall, 39 Whatley Road, Bristol, BS8 2PS

Infection and Immunity Annual Symposium 2019
24 April 2019, 9.30 - 14.00
Keynotes:
Susan Joyce (University College Cork and APC Microbiome Ireland)
Michael Cox (Imperial College London)
G13-14 Life Sciences Building

SETsquared #Idea2Pitch Event
30 April 2019, 12.30 - 16.30, Barton Hill Settlement, Bristol

CMM seminar
30 April 2019, 13.00 - 14.00, Prof Mark Marsh (MRC, LMCB, University College London), Lecture theatre C42, Biomedical Sciences Building

UoB EVENTS

Note new date: Designing digital interventions to support physical activity for people with long-term conditions
1 May 2019, 13.00 - 14.00, Prof Lucy Yardley (University of Bristol), Room G.1S HEPPLE, School of Geographical Sciences, University Road

Statistics Clinic
1 May 2019, 14.00 - 15.30, SM3 Mathematics Building

Exploring motif-based design patterns for biological computation
1 May 2019, 14.00 - 14.00, Boyan Yordanov (Microsoft Research)

NIHR Grant Applications – Seminar and Support Event
2 May 2019, 9.30 - 16.30

LGBT+ Supporters Programme launch
2 May 2019, 12.00 - 13.30, Great Hall, Wills Memorial Building, Bristol, BS8 1RL

Water, Sanitation and Hygiene (WASH)
2 May 2019, 12.30 - 14.00

Research without Borders 2019
7 May 2019, 10.00 - 17.00, Colston Hall, Bristol

CMM seminar
7 May 2019, 13.00 - 14.00, Prof Paul Moss (University of Birmingham), C42 Biomedical Sciences Building

My experience of becoming an NIHR Doctoral Research Fellow
9 May 2019, 12.30 - 13.30, Michelle Bonfield (Senior Vascular Clinical Scientist, UHBristol), Lecture room 3, Education & Research Centre, Upper Maudlin Street, Bristol BS2 8AE

OTHER EVENTS

Public Health Research and Science Conference 2019: Application of scientific methods to improve and protect health
9 - 10 April 2019, University of Manchester

NIHR Roadshow: NIHR Programme Grants for Applied Research (PGfAR) and Programme Development Grant (PDG) funding streams
10 April 2019, 10.00 - 14.00, Exeter

SEE THE FULL EVENTS LISTING ON THE I&I WEBSITE

NEWS

Teens keep active despite asthma or eczema

A research team found that both girls and boys at the ages of 12, 14 and 16 did not experience different levels of active or sedentary time if they had asthma or eczema compared to their peers. Using data from 6473 teenagers wearing accelerometers at the three age points, clinical reports of asthma or eczema together with weight and height measurements, this study is the first of its kind using data over time to assess the impact of the conditions on activity levels. All the information was taken from Bristol's Children of the 90s study. With an estimated 20% of children diagnosed with eczema, 9% with asthma and 20% found to be obese by the age of eleven in the UK it was thought that the long-term conditions impacted not just quality of life but physical activity. Although the research did not examine differing levels of severity, there can now be some reassurance that the conditions are not necessarily a barrier to a healthy lifestyle and that tailored fitness plans are not needed.

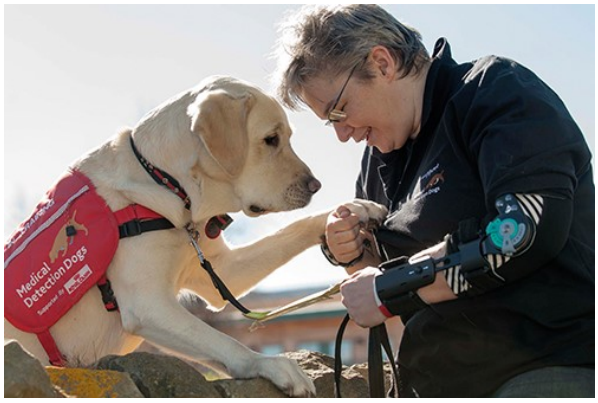
Read more

Jago R *et al*. (2019). Associations between physical activity and asthma, eczema and obesity in children aged 12 – 16: an observational cohort study. *BMJ Open*. 9:e024858.

Medical detection dogs

The best trained alert dogs have the potential to vastly improve the quality of life of people living with Type 1 diabetes. On average trained dogs alerted their owners to 83% of hypoglycaemic episodes in over 4,000 hypo- and hyper-glycaemic episodes that were examined. A hypoglycaemic episode can, if left untreated, lead to unconsciousness or even death. The findings confirm that alert dogs can help Type 1 patients regulate their blood sugars in a non-invasive way and avoid the risks of episodes.

Medical Detection Dogs train pet dogs to respond to respond to the odour of human disease and help owners live with life-threatening diseases. Familiar with their owners, dogs are conditioned to respond with alerting behaviours when their owners' blood sugar levels fall outside a target range.



Read more

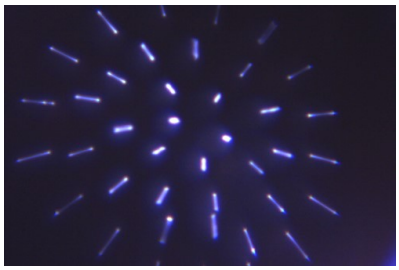
Rooney NJ *et al*. (2019). How effective are trained dogs at alerting their owners to changes in blood glycaemic levels?: variations in performance of glycaemia alert dogs. *PLOS One*. 14(1), e0210092.

Airborne survival of bacteria in aerosol droplets

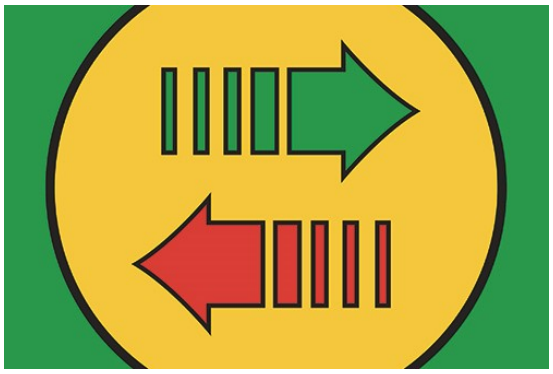
The airborne transmission of diseases including affects everyone with an average sneeze or cough sending around 100,000 contagious germs into the air at speeds of up to 100 mph. New research outlines a new technique that examines directly the environmental factors that control the transmission of disease to the level of a single aerosol particle and a single bacterium.

The impact of environmental factors on the viability and infectivity of pathogens in aerosol droplets remains poorly understood. The team established a novel approach for forming aerosol droplets containing a specific number of bacteria, trapping a cloud of these droplets of exact known population and simulating their environmental exposure over a time from five seconds to several days. The aerosol droplets are then gently sampled onto a surface to determine how many bacteria have survived their time in the aerosol phase. tuberculosis, the influenza virus, and foot and mouth disease. **Read more**

Fernandez M *et al*. (2019). Assessing the Airborne Survival of Bacteria in Populations of Aerosol Droplets with a Novel Technology. *Journal of the Royal Society Interface*. 16: 20180779.



Preventing Hepatitis C transmission



Providing clean injecting equipment through needle and syringe programmes is a highly cost-effective way of preventing hepatitis C (HCV) transmission among people who inject drugs and could save millions of pounds in infection treatment costs in the UK. Over 200,000 people are infected with HCV in the UK and over 90% of new infections are acquired through injecting drugs. Needle and syringe programmes provide sterile injecting equipment and other prevention and support services. In the UK, they are delivered through pharmacies, mobile vans and specialist agencies.

Using data from three cities with different levels of HCV infection among people who inject drugs – Bristol (45%), Dundee (26%) and Walsall (18%) - the team estimated the costs of existing needle and syringe programmes in each city, used mathematical models to estimate their impact on the spread of HCV infection, then estimated the cost-effectiveness of the programmes in each city. In all three areas, current needle and syringe programmes resulted in lower healthcare and treatment costs compared to if the programmes were stopped. There were also projected reductions in the number of HCV infections - by 8% in Bristol and Walsall and 40% in Dundee between 2016 and 2065 – and improvements in the quality of life among people who inject drugs.

Read more

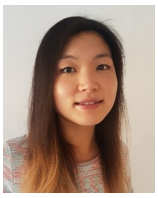
Funding successes: Part 1

Prof Jan Frayne (Biochemistry), from the **Medical Research Council**; £469,000 to develop model human cellular systems for the study of red blood cells diseases and as drug screening platforms.

Also to Jan Frayne from the **Wellcome Trust**, £70,000 for an Institutional Translational Partnership (iTP) Award.

Dr Laura Peachey (Bristol Veterinary School) has been awarded £9,678 by the **Horserace Betting Levy Board** (HBLB) for the project *Evaluation of the impact of fructooligosaccharide supplementation on the gastrointestinal microbiome and metabolome of Thoroughbred yearlings during nutritional stress*.

Katie Wong (Bristol Medical School) has been awarded an **Elizabeth Blackwell Institute** for Health Research Clinical Primer to study *Investigating Barriers to Living Donor Kidney Transplantation in the UK Chinese Population*.



Prof Alastair Hay (Bristol Medical School) is one of 46 academics in the UK to be awarded Senior Investigator status by the **National Institute for Health** (NIHR) in 2019. Senior Investigators are among the most prominent and prestigious researchers funded by the NIHR and the most outstanding leaders of patient and people-based research within the NIHR research community.

Cell therapy seed funding

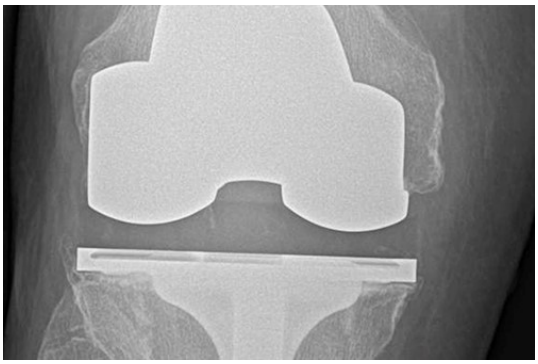
A company that promises to develop novel lifesaving cell therapies has attracted additional seed funding from some of the UK's major investors, bringing it one step closer to commercialising groundbreaking cellular research. Mogrify, which has its roots in research carried out at the University of Bristol, will use the funding to market novel IP and cell types generated using its proprietary direct cellular conversion platform, which will form the basis of novel therapeutics in areas including cardiac repair and cartilage regeneration. The seed funding will enable Mogrify to advance its systematic big-data science approach, powered by next-generation sequencing and gene-regulatory data. This is aimed at identifying the optimal combination of transcription factors (in vitro) or small molecules (in vivo), needed to convert any mature cell type into any other mature cell type without going through a pluripotent stem cell- or even a progenitor cell-state.

Direct reprograming between mature human cell types is a holy grail of regenerative medicine and pharmaceutical applications
Dr Darrin Disley, CEO (right)

It's this approach that makes Mogrify uniquely placed to address the issues of efficacy, safety and scalability currently associated with cell therapy development and manufacturing, which is estimated to represent a USD30 billion market opportunity.

High success rate for hip and knee replacements

After reviewing thousands of case studies going back 25 years across six countries, generalisable survival data is now available for the first time to estimate how long hip and knee replacements are likely to last. The findings show that eight out of ten knee and six out of ten hip replacements will still be in place after 25 years. These are two of the most common and effective forms of surgery, yet many will ultimately fail due to infection, fracture, wear and tear or reaction to wear particles. In many cases patients require revision surgery which is more prone to failure, associated with poorer function and more expensive than primary surgery. Knowing how long a replacement is likely to last is key for patients, orthopaedic surgeons and commissioners when deciding whether surgery should be done and when. **Read more**



Evans J *et al*. (2019). How long does a hip replacement last? A systematic review and meta-analysis of case series and national registry reports with greater than 15 years of follow-up. *The Lancet*. 393 (10172), pp647-654.

Hip Implant Prosthesis Study (HIPS)

The HIPS team, led by Dr Elsa Marques alongside a multidisciplinary team located within the Health Economics at Bristol group, has shown that small-head (less than 36 mm in diameter) cemented metal-on-plastic hip replacements are the most cost-effective in men and women older than 65 years. For adults younger than 65, small-head cemented ceramic-on-plastic hip replacements are more likely to be cost-effective. Small-head cemented metal-on-plastic implants have the longest track-record of use; they are safe and the cheapest implant type on the market but tend only to be favoured for older patients. Currently only 30% of patients in the NHS are offered a cemented implant, whereas the uptake of uncemented implants has been rising in the UK in the last ten years, particularly for younger adults. HIPS findings produce new evidence to inform clinical practice and influence NICE guidance. Regardless of their bearing material, there is no effectiveness or cost-effectiveness evidence that uncemented implants last longer and avoid revision surgeries for any patient group.

Elsa and colleagues have now been successful in obtaining further National Institute for Health (NIHR) funding to study the effectiveness and cost-effectiveness of knee implant prosthesis. The Knee Implant Prosthesis Study (KNIPS) started in January 2019.

Fawsitt CG *et al*. (2018). Choice of prosthetic implant combinations in total hip replacement: cost-effectiveness analysis using UK and Swedish Hip Joint Registries Data. *Value Health*. 22(3), pp303-312.

Watch the HIPS video

Taking the sting out of mouth ulcers

A large breakthrough has been made in the genetic understanding of mouth ulcers which could provide potential for a new drug to prevent or heal the painful lesions. Mouth ulcers affect up to 25% of young adults and a higher proportion of children. Previous research has shown that mouth ulcers are partially heritable, but until now there has been little evidence linking specific genes or genomic regions to mouth ulcers.

The study attempted to pinpoint areas of the genome associated with triggering mouth ulcers by looking systematically across the DNA code. By looking at mouth ulcers in different populations in the UK, USA and Australia, the researchers aimed to find genes which were consistently linked to mouth ulcers. They identified genetic variants associated with the condition by analysing genetic data; they discovered 97 common genetic variations across the genome that predispose people to mouth ulcers.

Findings show that several of the genes related to mouth ulcers are in pathways which are already targeted by drugs that are used to treat other diseases such as rheumatoid arthritis and psoriasis

Dr Tom Dudding, author

Dudding T *et al*. (2019). Genome wide analysis for mouth ulcers identifies associations at immune regulatory loci. *Nature Communications*. 10: 1052.

Antibiotic prescribing in primary care

Primary care is responsible for around 80% of all health service antibiotic prescribing in the UK, with rates likely to be similar worldwide. The UK government has set targets for reducing antibiotic prescribing because of concerns that the over-use of antibiotics is contributing to antimicrobial resistance, posing a serious risk to public health. Alastair Hay, Professor of Primary Care, has responded to two studies published in the British Medical Journal, one which found that delaying or withholding antibiotics for people aged over 65 with symptoms of urinary tract infection (UTI) appears to be associated with higher risk of bloodstream infection (sepsis) and death, and another which found that most antibiotic courses for common infections, such as respiratory infections, exceed new recommended guidelines.

These...illustrate the complexity of decision-making for GPs about when and how to prescribe antibiotics. The first suggests that older adults should start taking antibiotics as soon as possible after diagnosis with a UTI to reduce the risk of serious complications; the second, that adhering to national guidance on the length of treatment with antibiotics for common infections would result in around 65 million fewer antibiotic days each year in the UK

These studies are to be welcomed as important new evidence to inform antibiotic prescribing policies.

Read more

Equality, Diversity and Inclusion (EDI)

The Elizabeth Blackwell Institute has appointed a new EDI Champion, **Fiona McPhail**, who took up her post in February 2019.
Fiona's main focus will be on health and life sciences research communities and will be working very closely with the Health and Life Sciences Faculty EDI leads to ensure work complements and aligns with Faculty priorities.
Writing a blog on International Women's Day (21 March 2019), Fiona remarked "As a sector, Higher Education has been grappling with how we enable all groups to enter and thrive, striving to become institutions which are fair for all and where everyone can achieve according to their ability.
We have travelled a long way, with sector wide initiatives providing a platform for change and a structured and assessed methodology for analysing outcomes. We know, however, that despite our efforts, we are not yet there and there is more for us to do."

Read the full article here

Recognition in medicinal chemistry

Prof Varinder Aggarwal of the School of Chemistry has been recognised for his work in the field of synthetic chemistry after being awarded the prestigious Yamada-Koga Prize 2019 from the University of Tokyo. He is the 25th recipient of the prize which is awarded annually to a scientist whose research has had a major impact in the fields of synthesis and the function of optically active compounds.

We work in the field of organic synthesis - making complex molecules that exist in nature and analogues that do not, but without using nature's complex machinery to do so. We use small-molecule catalysts and reagents to control whether we generate left or right-handed molecules and then piece them together, like Lego bricks, to create complex structures with desirable characteristics which maybe anything from anti-bacterial to anti-cancer compounds.

Prof Aggarwal has also received an Arthur C Cope Scholar Award 2019 administered by the American Chemical Society.

Aggarwal had developed synthetic methodology that is becoming used regularly by both process and medicinal chemists, and he has done this in a uniquely elegant and thought-provoking way– John Hartwig

ACS Chemistry for Life®

Partnerships and strategic relationships

As part of the University's commitment to increase support for collaborative working, partnerships and engagement, the Research and Enterprise Development (RED) division is bringing together Partnerships and Programmes into a single team.

This team will combine the current Programme Management group with the recently formed Partnerships and Alliances team to provide integrated support for the University's major Research and Enterprise programmes and partnerships. The single team is part of a continuous improvement activity led by the Pro Vice-Chancellor for Research and Enterprise and the Director of Strategic Alliances. In addition to providing greater visibility within the institution the team will provide more comprehensive support for opportunities such as the Industrial Strategy Challenge Fund (ISCF) and Temple Quarter Enterprise Campus (TQEC) which necessarily involve many of the University's strategic partners. The revised team will continue to provide support for all major research and innovation-related programmes at Bristol as well as partner relationship management in support of these. It will also provide support for all forms of external engager/business enquiry, support for the development and scaling up of major partnerships, and key account management for the University's portfolio of strategic relationships.

Alliances and partnerships portal

2019 Hooke Medal of the British Society of Cell Biology

Eugenia Piddini, Professor of Cell Biology and Wellcome Trust Senior Research Fellow, was awarded the 2019 Hooke Medal in recognition of her outstanding contribution to cell biology.

Her lab studies cell competition, resulting in fit cells (winners) being able to colonise tissues as they kill and replace less-fit cells (losers). Her group is exploring how cell competition could be used for therapeutic strategies in regenerative medicine and cancer. The labs goal is to understand the impact of cell competition on tissues and the mechanisms that cells use to compete. To achieve this the group combine two complementary approaches: studies in *Drosophila* to capture the complexity of these interactions *in vivo*, and mammalian cell culture to follow the dynamics of cell competition, including by live imaging. Recent work showed that in adult homeostatic tissues, cells compete, and healthy cells eliminate sub fit cells by apoptosis. They also found that cell competition leads to healthy tissue expansion by promoting stem cell proliferation and increased symmetric self-renewal. Her discovery of mechanical cell competition is considered a breakthrough in the field.

Read more

What's normal in children's respiratory infections?

Dr Emma Anderson, Senior Research Associate, on a blog written for the Health Protection Research Unit (HPRU) in Evaluation of Interventions:

Children get coughs, colds and ear infections regularly. Symptoms of these respiratory infections (runny nose, cough and sore throat) can seem never-ending. In the Evaluation of

Enhanced Paediatric Respiratory Infection Surveillance (EEPRIS) Study, led by Prof Alastair Hay, parents across Bristol were recruited to detail their children's symptoms as they became ill. Gathering information in the community meant they were able to find out more about common respiratory illnesses, and gave a more accurate picture of how likely parents are to consult for these common illnesses. Two of the main findings were:

i) it takes up to three weeks for most children's respiratory infections to resolve

ii) about one in twelve children who develop a respiratory infection see their GP

Hay AD *et al*. (2019). Respiratory tract infections in children in the community: prospective online inception cohort study. *Annals of Family Medicine*. 17(1), pp14-22.

Funding successes: Part 2

Osteoporosis is largely genetically determined, so discovering new bone strengthening genes could lead to novel and better treatments. The results of a pilot study by Elizabeth Blackwell Institute (EBI) fellow led to the success of a **Versus Arthritis Foundation Fellowship for** Dr Dylan Bergen. An EBI Postgraduate Discipline Hopping Fellowship undertaken in Bristol Medical School allowed Dylan to identify genes with the greatest bone strengthening potential,

before 'hopping' back to his PhD discipline in dynamic cell biology to validate his predictions on zebrafish in the lab. His aim was to lay the foundation for future studies to identify therapeutic drug targets and develop medical interventions to prevent osteoporotic fractures in humans.

Dr Joshua Bell (Bristol Medical School: Population Health Sciences) has been awarded an **Elizabeth Blackwell Institute Early Career Fellowship** to pursue a project entitled *Altering body composition to prevent type 2 diabetes*.

A **European Research Council** Advanced Grant has been awarded to Prof Imre Berger (Biochemistry and Director, Max Planck-Bristol Centre for Minimal Biology). The project, *Precision Docking of Very Large DNA Cargos in Genomes*, will implement a comprehensive synthetic biology approach to create new and powerful, virus-derived nano-devices with unprecedented capacity to rectify disease-causing errors in mammalian genomes. The tools they develop will be applied to potentiate cell-based immune therapies, towards a step-change in cancer treatment.

External engagements

Dr Gemma Lasseter, Senior Research Associate and Programme Manager for the NIHR Health Protection Research Unit in Evaluation of Interventions was awarded a place as one of the competitively selected 30 future research leaders on the 2019 **GW4 Crucible programme**. The Crucible is a fully funded development programme for aspiring research leaders to explore interdisciplinary and collaborative approaches. Over a series of workshops candidates also get to connect with expert guest speakers. GW4 Crucible 2019 will focus around the theme of 'Digital Innovation'. Gemma's current research examines digital health interventions in general practice, with a focus on supporting patients to manage their own health conditions and mitigating potential harms. As a mixed-methods researcher, she is particularly keen to evaluate digital health interventions in order to find out what works well, for whom, and in what circumstances.

Drs Howard Thom, Jo Thorn and Caoimhe Rice attended the **ISPOR Europe conference** in Barcelona which took place 10-14 November 2018. Jo presented her cost effectiveness analysis of a novel use for CBT by clinical teams to reduce arthritis fatigue in the RAFT study. Caoimhe presented her methodological work *Direct data without duplication of effort,* a process for obtaining resource use data directly from hospital informatics systems in lieu of research nurse collected CRFs.

Technicians make it happen—Green Lab Accreditation

The University of Bristol's Biomedical Sciences Building, which houses the Schools of Biochemistry; Cellular and Molecular Medicine; and Physiology, Pharmacology and Neuroscience, has gained 100% Green Lab Accreditation status. This was awarded in collaboration with NUS's Green Impact scheme and achieved through a series of rigorous, green-initiatives.

University laboratories require large amounts of energy and resources, on average consuming 5-10 times more energy than other academic spaces. Occupying only 6% of University space, laboratories account for 40% of energy, water and waste.

Befitting of a city well-known for its green-credentials, over 170 laboratories within the University's Biomedical Sciences Building have made changes to ensure that the world-leading teaching and research is done with utmost efficiency and minimal waste, resulting in a combined cost saving of over £85,000 worth of energy over the past two years. Steps taken include the replacement of energy-inefficient laboratory equipment such as ultralow freezers, drying cabinets and biosafety cabinets have saved £22,000, or 120 tonnes of CO_2.

Building on this success the University is now participating in a national pilot of the Laboratory Efficiency Assessment Framework (LEAF).

£50 million funding for Centres for Doctoral Training

The Engineering and Physical Sciences Research Council (EPSRC) has awarded Bristol funding for nine Centres for Doctoral Training (CDTs) – the highest number awarded to any university in the country.

The centres will train and equip engineering and science students with the skills needed to tackle global challenges such as sustainable energy and cyber security. Bristol's nine centres will cover a broad range of disciplines that will be vital for knowledge and expertise in the future:

- CDT in Composites Science, Engineering and Manufacturing
- CDT in Future Autonomous Robotic Systems (FARSCOPE-TU: Towards Ubiquity)
- CDT in Trust, Identity, Privacy and Security in Large-scale Infrastructures (TIPS-at-Scale)
- CDT in Computational Statistics and Data Science: COMPASS
- CDT in Quantum Engineering
- CDT in Technology Enhanced Chemical Synthesis
- CDT in Aerosol Science
- CDT in Digital Health and Care
- CDT in Future Innovation in Non-Destructive Evaluation (FIND)

EPSRC
Engineering and Physical Sciences Research Council

Zoonotic TB

On World Tuberculosis Day (24 March 2019) Dr Ellen Brooks-Pollock (Lecturer in Veterinary Public Health and Lecturer in Infectious Disease Mathematical Modelling) argued on an NIHR Health Protection Research Unit in Evaluation of Interventions blog that with 40 new cases of zoonotic tuberculosis (TB) in the UK in 2017, and incidence globally likely to be underestimated, that it's time that this preventable disease was taken seriously.

Bovine TB disease in humans is called zoonotic TB. In 2018, it is estimated that there were 150,000 new cases of zoonotic TB worldwide, although this is almost certainly an underestimate because zoonotic TB is clinically indistinguishable from other forms of TB and the majority of cases occur in rural populations with limited access to healthcare.

Zoonotic TB has been neglected because of its relatively small contribution to the global TB burden. However, zoonotic TB is now receiving attention because of the 2035 target for global TB elimination and was explicitly included for the first time in the Global Plan to End TB.

In the UK, we have sporadic cases of zoonotic TB. In 2017, 40 people were diagnosed with zoonotic TB in the UK: although this might seem like a low number, the number of cases has doubled since 2004, and 1 in 8 farmers in south-west England may have latent TB. Half of zoonotic TB cases in the UK report occupational contact with cattle, like a Gloucestershire veterinarian who lost 7.5kg in weight, and two thirds of cases report consuming unpasteurised milk. It is no longer acceptable to condemn zoonotic TB as a minority concern.

Boost to Bristol's research in Africa

A generous £1 million gift from The Perivoli Trust will create new roles and opportunities for Bristol researchers to tackle key challenges and pioneer innovative solutions for the most pressing concerns on the continent. A new Perivoli Chair in Africa Research and Partnerships will develop and expand the University's portfolio of interdisciplinary research in partnership with universities, international agencies, charities, governments and organisations across Africa.

The gift will additionally fund opportunities for Vice-Chancellor Fellowships, PhD scholarships and ultimately lead to the creation of a new Centre for Africa Research and Partnerships to achieve real and impactful change in the Trust's priority areas of research: education, health and wellbeing, sustainable agriculture, resilience and governance, and migration and mobility.

The University has over 50 active research projects working with African partners, co-created with regional communities to bring real and local impact. Working with its partners in the Worldwide Universities Network and international agencies, Bristol leads projects on sustainable ruminant farming; migration data, policy and development; health outcomes of migration events, and resilient peacebuilding in Africa.

A delegation from Bristol visit the University of Nairobi for the Worldwide Universities Network Global Africa Group workshop in Nov 2018

New GW4 Alliance projects announced

On 14 February 2019 GW4 announced funding for 12 new collaborative research communities tackling a range of global and industrial challenges, including:

GW4 NanoEvade: Smart design of nanoparticle-drugs to evade the immune response (Drs Charlie Jeynes & David Richards: Exeter; Prof Karen Edler: Bath; Dr Ash Toye: Bristol; Drs Mark Young, Riccardo Bonsignore & Andreia De Almeida: Cardiff)

Imaging Arthritis Consortium (Dr Benjamin Sherlock & Prof Peter Winlove: Exeter; David Williams & Prof Cathy Holt: Cardiff; Flossie Carpenter & Michael Whitehouse: Bristol; Dr Elise Pegg & Prof Richie Gill: Bath)

Stratify and Treat – a new horizon for type 1 diabetes after 100 years (Dr Sarah Richardson, Prof Noel Morgan, Dr Richard Oram, Dr Angus Jones, Prof Andrew Hattersley, Dr Bev Shields & Dr Tim McDonald: Exeter; Dr Danijela Tatovic, Prof Colin Dayan & Prof Susan Wong: Cardiff; Dr Kathleen Gillespie, Alistair Williams & Dr Anna Long: Bristol)

See the full list of funded projects on the GW4 news article

Collaborating with the nuclear medicine community

The South West Nuclear Hub (the Hub), funded by a HEFCE Catalyst Fund grant, facilitates the University of Bristol's leading role in co-ordinating and growing regional nuclear energy activities. The Hub is an umbrella for civil nuclear energy related research, innovation and teaching activities at Bristol.

Launched in September 2016, it acts as a focal point for nuclear energy research and teaching at Bristol, providing a common collaboration space for academics across the University. Externally, it draws together academic, industrial and government institutions to provide an efficient interface for research and development capability across the south west region.

Via the Hub, UoB has developed a nuclear energy research, innovation and teaching strategy which includes ambitious plans for growth both in terms of activity and new facilities. Since 2015 the Hub has been home to a unique interdisciplinary MSc programme in Nuclear Science and Engineering, a research-focused postgraduate programme with significant industry input.

Our objectives include:

- Providing a link between Higher Education, Nuclear Industry and Government sectors
- Creating a single door for the nuclear industry to access and form partnerships in academic research and teaching in the region
- Joining capability, activity and resource
- Fostering an integrated mixture of multidisciplinary students, staff and experts
- Increasing the number and quality of people trained in nuclear energy and related fields
- Increasing industrial investment in research and teaching
- Shaping the direction of regional and national nuclear energy-related research and teaching to ensure it best meets industry needs
- Establishing a joint knowledge base between academia and industry
- Facilitating the transfer of relevant skills and knowledge
- Delivering innovative underpinning science, engineering solutions and technologies that have a positive impact on the economy and society

SOUTH WEST NUCLEAR HUB

Nuclear medicine

The Hub's academic community is able to offer competencies and expertise to the medical community. Focused mainly around equipment development, our researchers have innovative technologies, which could be tailored for the needs of various medical applications.

In particular Dr **John Day** from the Interface Analysis Centre (IAC) had some of his work going to clinical trials, including:

- **Development of probes for cancer detection**
- **Use of Raman spectroscopy for lymphoma detection**
- **Kidney perfusion monitoring after transfusion using fibre optics**

Others, such as Dr **Jaap Velthuis** (Physics) can offer:

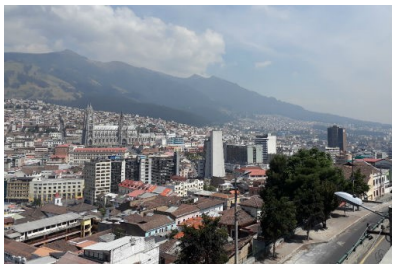
- **Cameras-driven methodologies to monitor and adjust the dosimetry in real time**
- **Independent monitoring of beams used to treat tumours in order to adjust in real time localisation and dosimetry of these beams**

If you have an idea or project that aspects of nuclear medicine could contribute to, contact enquiries@southwestnuclearhub.ac.uk.

UK Research and Innovation Global Research Hubs

Scientists from the University of Bristol will be sharing their expertise as part of two new £20 million UK Research and Innovation (UKRI) Global Research Hubs funded through the Global Challenges Research Fund (GCRF). The first will focus on urban disaster risk and the second aims to tackle the challenge that nitrogen pollution poses for the environment, food security, human health and the economy in South Asia.

The South Asian Nitrogen Hub, a partnership led by the UK's Centre for Ecology & Hydrology, includes around 50 organisations from across the UK and South Asia of which Bristol is one of 14 UK partners. The Hub will be awarded £19.6 million over the next five years, comprising £17.1 million from UKRI and £2.5m from UK and international partners. Contributions in-kind worth a further £7 million are being provided by partners of the UKRI GCRF South Asian Nitrogen Hub. Nitrogen is connected to air pollution, biodiversity loss, the pollution of rivers and seas, ozone depletion, health, economy and livelihoods; N_2 pollution is caused by emissions from chemical fertilisers, livestock manure, and burning fossil fuels. The Hub will bring previous research together in a more coherent approach.



The UKRI GCRF South Asian Nitrogen Hub will study the impacts of the different forms of pollution to form a coherent picture of the nitrogen cycle. In particular, it will look at nitrogen in agriculture in eight countries.

Read more

Data science capabilities

The University of Bristol and LV= General Insurance (LV=GI) have created a new partnership with the aim of working together to make advancements in the field of data science by sharing knowledge, skills and opportunities. As part of the partnership, LV=GI will establish a team of data scientists and engineers who will be based at the University, working closely with the Faculties of Engineering and Social Sciences & Law, and the Jean Golding Institute (JGI) for Data Science and Data Intensive Research. The teams will carry out research and development projects to better understand the possibilities presented by machine learning and AI in the insurance sector. Collaborating with the University's social scientists, the teams will work to better understand the societal challenges and opportunities of digital technologies.

New Dean of Health Sciences

Prof Jane Norman, currently Professor of Maternal and Foetal Health at the University of Edinburgh, will take up the formal responsibilities of Dean of the Faculty of Health Sciences from 1 August 2019. Her research focusses on the pregnancy "stressors" of obesity, maternal depression/stress, inflammation and hypoxia.

ELIZABETH BLACKWELL FUNDING

EBI Postgraduate Discipline Hopping Fellowships
This scheme is designed to support a small number of postgraduate researchers currently enrolled on one of the University of Bristol Wellcome Trust-funded 4 year PhD programmes.

Closing date: 9:00 11 April 2019

EBI MRC Confidence in Concept Scheme (CIC)
To support health-related translational projects. There is a 2 stage application process.

Closing date: 9:00 11 April 2019

Bioethics, Biolaw and Biosociety Research Strand funding call
Applications are invited, seeking support for research activities, which are intended to lead to larger scale, funded research projects.

Closing date: 9:00 12 April 2019

Daphne Jackson Fellowship
The Fellowship is intended to support individuals who want to return to research in their careers as scientists, engineers, technologists and mathematicians, following a break of two years or more taken for family, caring or health reasons, and who will be conducting health-related research.

Closing date: 13 May 2019

EBI Translational Acceleration and Knowledge Transfer (TRACK)
This scheme provides funding to support health related translational projects.

Closing date: 9:00 13 June 2019

EBI Identifying Candidates for Wellcome Trust Investigator Awards
This scheme is designed to support a small number of permanent academic staff at UoB within the first five years of their appointment, who are planning to apply for an Investigator Award from the Wellcome Trust. Applications will be accepted on a rolling basis.

Heads of School are asked to nominate members of staff who can be eligible for this scheme by emailing ebi-health@bristol.ac.uk

Closing date: none

ELIZABETH BLACKWELL FUNDING

EBI Workshop Support

Support interdisciplinary workshops in health research at new or emerging interface between two or more disciplines. Applications reviewed all year.

Closing date: none

Returning Carers Scheme

To support academic staff across all faculties in re-establishing their independent research careers on return from extended leave (16 weeks or more) for reasons connected to caring (e.g. maternity leave, adoption leave, additional paternity leave, leave to care for a dependant).

Closing date: 30 April and 31 October each year

EBI Bridging Funds for Research Fellows

This scheme is designed to support a small number of academic staff at the University of Bristol who currently hold an externally funded research fellowship. Applications accepted on a **rolling** basis.

Closing date: none

The Elizabeth Blackwell Institute for Health Research is officially a member of Equality, Diversity and Inclusion in Science and Health, or EDIS, an initiative set up by the Wellcome Trust, the Crick Institute and GSK.

Find out more about EDIS

FUNDING OPPORTUNITIES

Would you like to receive timely, tailored funding opps information?
Do you want to know what funding opportunities come up in your research area?
Get tailored funding alerts?

Research Professional provides access to an extensive database of funding opportunities, and can send out tailored alerts based on keywords that you input, ensuring that the funding alerts you receive are the ones you want to hear about. 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 home or away, not just while on the University network.

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:

- **Set up automated funding opportunity email alerts** - **tailored according to your discipline and research interests**, an easy process that will take just a few minutes to set up through the use of keywords
- **Save searches and bookmarks** - store items of interest for future reference, download and email to colleagues
- **Sign up for higher education news bulletins** – want to hear about what is going on in the broader HE environment? Latest news on the REF, setting up of UKRI etc? Sign up for the 8am playbook or the Research Fortnight news publications and stay up to date with the latest news.

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

British Society for Immunology
Travel awards

Closing Date: 1-May-19 Award amount: £1,000

Enable members to attend scientific meetings or visit laboratories for specific short-term activities, such as collaborative research or to learn new techniques.

National Institute of Allergy and Infectious Diseases, USA
Natural killer cells to induce immunological memory to prevent HIV infection (R01)

Closing Date: 7-May-19 Award amount: USD unspecified

This supports multidisciplinary, hypothesis-driven research on NK cells, leading to the discovery of pathways relevant for early immune responses and immune regulation impacting the potential protective immunity to be induced by HIV vaccination.

Cancer Research UK
Cancer immunology project awards

Closing date: 9-May-19 Award amount: £300,000

These aim to catalyse research and build the UK's research base in cancer immunology by funding immunologists in non-cancer fields.

Medical Research Council
Research grants – infections and immunity

Closing date: 16-May-19 Award amount: £1 million

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.

Medical Research Council
New investigator research grant – infections and immunity

Closing date: 16-May-19 Award amount: unspecified

This supports researchers who are capable of becoming independent PIs and who are ready to take the next step towards that goal within the areas of infections and immunity. Applicants are expected to combine their time with a portfolio of other activities.

Institut Pasteur
Sanofi-Institut Pasteur international awards

Closing date: 25-Jun-19 Award amount: €300,000

These recognise scientists whose research demonstrates scientific progress in immunology or microbiology and infection.

Healthcare Infection Society
Major research grant

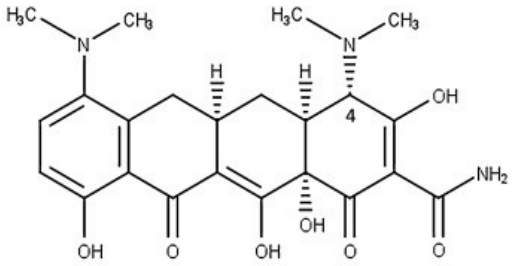
Closing date: 01-Sep-19 Award amount: £99,000

This supports work on the subject of healthcare-associated infections and infection prevention and control. The grant is suitable for a PhD studentship, MD or other research worker and related consumables and equipment, with a preference towards translational research rather than pure science topics.

THIS ISSUE'S FEATURED ARTICLE

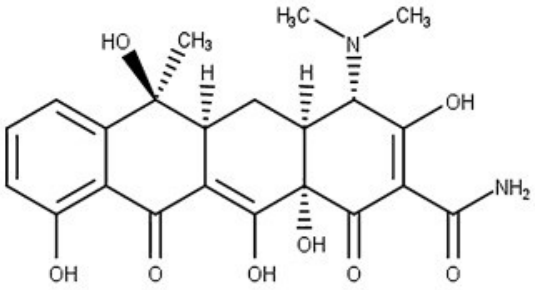
Development, validation and application of a novel HPLC-MS/MS method for the measurement of minocycline in human plasma and urine

Bayliss, MAJ, Rigdova K, Kyriakides M, Grier S, Lovering AM, Williams H, Griffith DC, MacGowan A.
Journal of Pharmaceutical and Biomedical Analysis. 169, pp90-98



Minocycline

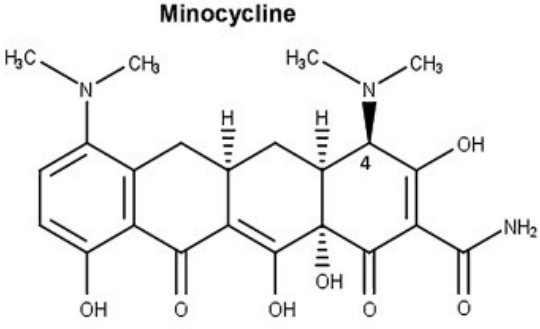
New treatments are urgently required to treat infections caused by multi-drug resistant *Acinetobacter baumanni,*. To address this need, a new formulation of Minocin®, (minocycline for injection) has been developed that allows for higher doses of minocycline to be administered. Phase 1 clinical trials were conducted in healthy volunteers to assess the safety and pharmacokinetics (PK) of this new formulation at higher doses. In order to generate PK data, novel, selective and simple HPLC-MS/MS based assays were developed and validated for the determination of minocycline (MC) in human plasma and urine. The respective working ranges were 0.05 to 30 mg/L and 0.1 to 30 mg/L. Removal of endogenous proteins with trichloroacetic acid was used as a simple means of extracting MC from the samples. An analogue, tetracycline was used as the internal standard (IS). Chromatographic separation, including that of MC from its 4-epimer (4-EMC), was achieved on a Waters XBridge BEH C18 column (50 x 4.6 mm ID, 5 µm) with gradient elution. The mobile phases comprised water containing 5 mM ammonium formate at a pH of 2.5, and methanol containing 5 mM ammonium formate. The internal standard (IS) was tetracycline, a structural analogue of minocycline.



Tetracycline

The methods were fully validated and met regulatory acceptance criteria for intra-run and inter-run accuracy and precision, carryover, dilution integrity and matrix effects. Mean extraction recoveries ranged between 64.3% and 84.6% for MC and 64.3% for the IS. There was no significant ion suppression or enhancement for MC or the IS. The validated assays were successfully applied to 1423 plasma and 689 urine samples from a Phase 1 clinical study.

Minocycline



4-Epiminocycline

There was no evidence of instability, or significant interconversion between MC and 4-EMC, in stored clinical samples, spiked plasma and urine samples, or their extracts, under various test conditions.

CONTACTS

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

Co-Chair: Ruth Massey
Reader

Co-Chair: Adam Finn
Prof of Paediatrics

- Borko Amulic - Lecturer in Immunology
- Matthew Avison - Co-Director, BristolAMR
- Philip Bright - – Clinical Immunologist
- Andrew Davidson - Senior Lecturer in Virology
- Hannah Fraser - Senior RA in Infectious Disease Mathematical Modelling
- Wendy Gibson - Professor of Protozoology
- Kathleen Gillespie - Reader in Molecular Medicine, Head of the Diabetes and Metabolism Research Group
- Melanie Hezzell - Senior Lecturer in Cardiology
- Peter Muir - Clinical Virology
- Angela Nobbs - Lecturer in Oral Microbiology
- Emma Pritchard - Research Development Associate: Network Facilitator
- Annela Seddon - Director of the Bristol Centre for Functional Nanomaterials
- Katy Turner - Senior Lecturer in Veterinary Infectious Diseases
- Peter Vickerman - Professor of Infectious Disease Modelling
- Linda Woolridge - Chair in Translational Immunology
- Catherine Brown - Network Administrator

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