Quadram Institute

Autumn 2019

Welcome to the newsletter of the Quadram Institute.

This issue highlights recent research breakthroughs at the Quadram Institute (QI) that could have positive impacts on public health. Working with clinicians our researchers have shown how the latest sequencing technologies can aid in diagnostics and surveillance. Coupling these techniques with 'Big Data' analytical approaches will be vital to addressing 21st century population health challenges, and the QI aims to be a leader in this area.

Big Data in the NHS was the topic of a roundtable discussion I attended with Patricia Hart at the policy development think tank Reform. This roundtable was sponsored by QI and explored how universities and industry can work with government to realise potential applications of Big Data. The event was chaired by Baroness Blackwood, Parliamentary Under-Secretary of State, Department of Health and Social Care (DHSC) and included senior policy-makers, public service practitioners, academics and industry leaders.

Claudia Martinez (Research Manager, Reform), Baroness Blackwood, Prof. Ian Charles

We continue to build our team and are pleased to welcome Professor Cynthia Whitchurch to the QI. Cynthia is setting up a research group investigating bacterial lifestyles, and how these make them more infectious or resistant to antimicrobials. Cynthia joins us from the ithree institute at the University of Technology Sydney. Her research led to the discovery that extracellular DNA is required for biofilm development.

We continue to welcome visitors to our new building to share our vision to understand how food and microbes interact to promote health and prevent disease. In June, we had the honour of hosting His Excellency Simon Smits, Ambassador of the Netherlands to the UK. The Ambassador visited the Norwich Research Park as part of an international trade delegation to East Anglia to learn about the region's world-leading life sciences research and trade opportunities.

In September Sir John Kingman, Chair of UK Research and Innovation (UKRI) toured the building as during a visit to the Norwich Research Park. Newly-appointed Chief Medical Officer Prof. Chris Whitty also visited in his previous role as Chief Scientific Adviser for the DHSC to learn about our public health research.

We also showcased the QI to the UK Science Park Association/S-Lab Conference on Research, Translation and Innovation, discussing best practice on design and engineering at this specialised event.

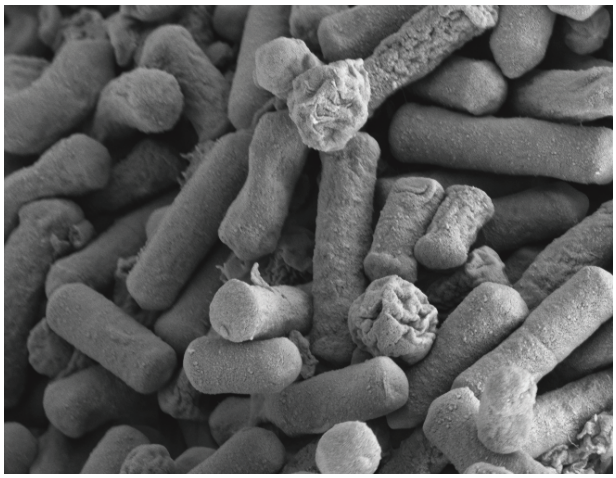
Ian Charles, Quadram Institute Director

New rapid test can diagnose pneumonia and other lower respiratory infections

Justin O'Grady and his team have led the development of a new rapid way of diagnosing bacterial lower respiratory tract infections in hours rather than days, that could improve patient care and slow the spread of antimicrobial resistance.

The researchers used Oxford Nanopore's portable MinION sequencing device to facilitate real-time sequencing, data generation and analysis. This helped reduce time-to-result from days to hours. The new method incorporates a step that rapidly and efficiently removes human genetic material from the sample provided by the patient, thereby leaving mainly pathogen DNA for sequencing.
bit.ly/QI1901

Themoula Charalampous loading a MiniON



Whole genome sequencing benefits for surveillance of bacteria behind gastroenteritis

Working with Public Health England, QI researchers have published a new study that has used whole genome sequencing to study strains of Clostridium perfringens bacteria associated with cases of gastroenteritis over a seven year period.

Their findings could help improve public health by telling us more about the bacteria, and also show how using whole genome sequencing could improve surveillance and control of these bacteria.
bit.ly/QI1902

Clostridium perfringens. Image by Kathryn Cross, Quadram Institute

Antibiotic usage associated with increased risk of rheumatoid arthritis

A new study has provided evidence that antibiotic usage is associated with an increased risk of developing rheumatoid arthritis.

Lindsay Hall's group, working with researchers from Keele University, analysed data from primary care medical records. They found that the odds of developing rheumatoid arthritis were 60% higher in those exposed to antibiotics than in those not exposed. The odds increased with the number of antibiotic treatments, and how recently they were taken.
bit.ly/QI1903

Unexpected microbiome collapse after admission to intensive care

Research led from the QI has found that potentially harmful microbes overwhelm the healthy gut microbiota in intensive care patients. Using shotgun metagenomics, the research team led by Mark Pallen found that in long-stay ICU patients, the gut microbiome became dominated by bacteria with the potential to become pathogenic.
bit.ly/QI1904

£5 million programme to study benefits of a plant-based diet

The QI is one of the partners in a new £5million Wellcome Trust-funded project that will bring 25 new PhD studentships to the Norwich Research Park addressing the complex relationships between plant-based foods, metabolism, gut microbiota and health.

The Edesia project, led by the University of East Anglia, will help address gaps in the UK's nutritional expertise and advance understanding of plant-based nutrition and address diet-related chronic illness globally.
bit.ly/QI1905

Taming the virosphere

Evelien Adriaenssens contributed her expertise in virus classification to a study describing a new system to classify automatically thousands of new viruses being discovered by modern genomics.

Traditionally, bacteriophages were characterised individually and classified based on morphological and genome-based characteristics into new species, genera and families. Advances in sequencing technologies and computing have allowed researchers to predict hundreds of thousands of new phages based on genome sequencing information. Evelien helped Ohio State University researchers harness the power of network analysis to develop a new tool that can obtain a level of classification in hours that would take years to do manually.
bit.ly/QI1906

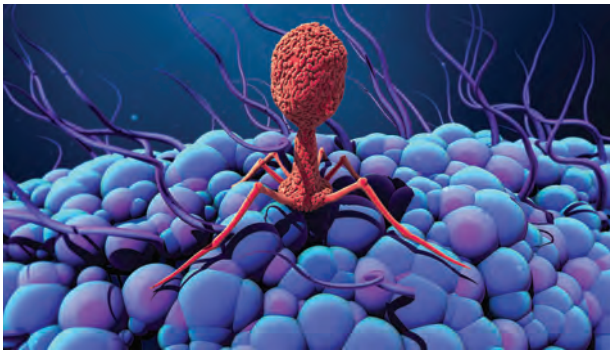


Illustration of a phage infecting bacterium

Robert Mills, Consultant Urological Surgeon NNUH and NHS co-investigator, Antonietta Melchini, Human Study Lead at the Quadram Institute Bioscience and Tracey Livingstone Urology Research Fellow and Principal Investigator of the 'Norfolk ADaPt' study

New study to test the benefits of broccoli and garlic for prostate health

A new study has been launched to test whether broccoli and garlic can help improve prostate health.

The Norfolk Accumulation of Dietary Bioactives and Prostate Cancer (ADaPt) study will involve 40 patients who are due to receive a biopsy for suspected or previously diagnosed prostate cancer. Researchers at the QI and The Norfolk and Norwich University Hospital (NNUH) aim to expand our understanding of how consuming two different commercially available food supplements containing bioactive compounds from broccoli and garlic can improve prostate health. The study will take place in the QI Clinical Research Facility.
bit.ly/QI1907

New endoscopy unit praised for "exceptional patient experience"

The NNUH's endoscopy service has been described as the best in the country following an inspection. Assessors from the Joint Advisory Group (JAG) on Gastrointestinal Endoscopy, which is hosted by the Royal College of Physicians, visited the new unit at the Quadram Institute to ensure the Trust is meeting all regulatory requirements.

The service received high praise from assessors who were impressed by the design and found all endoscopists working to the "highest performance standards."
bit.ly/QI1908

GP Fellowship to develop ME/CFS champions for Norfolk

The Quadram Institute and the charity Invest in ME Research are partnering with Norfolk Clinical Commissioning Groups (CCGs) to provide a GP Fellowship aimed at improving outcomes for patients with Myalgic Encephalomyelitis/ Chronic Fatigue Syndrome (ME/CFS) in Norfolk and Waveney. The GP Fellowship will allow a GP to develop skills and personal and professional development in ME/CFS. They will spend one day a week working with Simon Carding's research group participating in the programme of biomedical research into the causes of ME/CFS.
bit.ly/QI1910

International internship investigates kefir

Mariano Malamud, a researcher from the National Council of Scientific and Technical Research (CONICET) in Argentina, has recently started an internship in Nathalie Juge's group. Mariano works on Lactobacillus kefiri, one of the most abundant lactobacilli species isolated from kefir, a probiotic product made from fermented milk. Mariano was granted a Wood-Whelan Research Fellowship from the International Union of Biochemistry and Molecular Biology (IUBMB).
bit.ly/QI1911

New podcast for microbial bioinformatics community

QI researchers Andrew Page, Nabil-Fareed Alikhan with Lee Katz from the Centers for Disease Control and Prevention have launched the Micro Binfie Podcast, a new podcast for scientists, researchers and clinicians working in microbial bioinformatics.
bit.ly/QI1912

Engagement Award for Lindsay Hall & the Guardians of the Gut

Lindsay Hall's achievements in communicating the wonders of the microbiome have been recognised by a UEA Engagement Award. "Guardians of the Gut" took the microscopic microbial ecosystem hidden inside our bodies and expanded it into an immersive, interactive walk-through model of what goes on in the gut.
bit.ly/QI1913

It's a boy! First baby born into the PEARL Study

The first baby has been born to a mother taking part in the PEARL (Pregnancy and Early Life) Study. This landmark study is aiming to learn how the transmission of beneficial microbes from mother to baby affects health. The PEARL Study is recruiting mothers who are less than 22 weeks pregnant. If you would like to take part or know someone who might be interested, please see
quadram.ac.uk/pearlstudy/

The PEARL Study
Pregnancy and EARly Life

Immune Mapping - This image is copyright © yascrawford photography. All rights reserved.

Art and science uncover ME

Artist Yasmin Crawford spent time with researchers as part of her MA project to capture how ME affects every aspect of people's lives, using photography and the visual arts to express the hidden impacts and the attempts to self-manage and emotions of the condition. Yasmin's work was exhibited at the 14th Invest in ME Research International ME Conference, and earned her a nomination for the Royal Photographic Society's Science Photographer of the Year competition.
bit.ly/QI1914