Quadram Institute
Science Health Food Innovation

Winter 2022/23

Quadram Institute

Welcome to the newsletter of the Quadram Institute

On behalf of the Quadram Institute, I was delighted to welcome Sir Patrick Vallance, the UK Government Chief Scientific Adviser, to the Quadram Institute during a visit to the Norwich Research Park in February.

Sir Patrick Vallance, along with the Chief Scientific Adviser at the Food Standards Agency, Prof. Robin May, visited the Quadram Institute on 6 February and Sir Patrick unveiled a plaque marking the formal opening of the institute.

The Government Chief Scientific Adviser met NHS staff and Quadram scientists who worked on COVID vaccine development and genomic sequencing of the virus. His visit reinforced the valuable work undertaken at the Quadram Institute. We are one of the UK's science national capabilities with scientists working to protect people from foodborne pathogens, optimise food and the gut microbiome to improve human health, and NHS clinicians and researchers working in our Clinical Research Facility and Endoscopy Unit.

The visit to the Norwich Research Park also took in a tour of the John Innes Centre and The Sainsbury Laboratory to hear more about the 'Healthy Plants, Healthy People, Healthy Planet' (HP3) vision, which outlines an ambitious vision for the future including solutions enabling agri-business and pharmaceuticals to create products with profound societal impact.

Sir Patrick Vallance, Government Chief Scientific Adviser, said: "I was delighted to formally open the Quadram Institute and congratulate its staff on their work both during the pandemic and their day-to-day research and patient care. The important work being carried out at the Norwich Research Park is helping to improve the use of science in policymaking and service delivery."

Sir Patrick Vallance's visit underlines the cluster of scientific excellence that has developed here on the Norwich Research Park, it's a real strength for our region and is a scientific driver for innovation and growth regionally and nationally.

Combined with visits to the Earlham Institute and Tropic Bioscience, he also saw first-hand how the cohesive nature of the research cluster is enabling big data analysis to sequence genes at a rate unimaginable only a few years ago, accelerating the breeding of desirable traits into crops, and generating worldwide partnerships to tackle emerging biosecurity threats- including ash dieback, *Xylella*, and currently unforeseen threats to food production and human health.

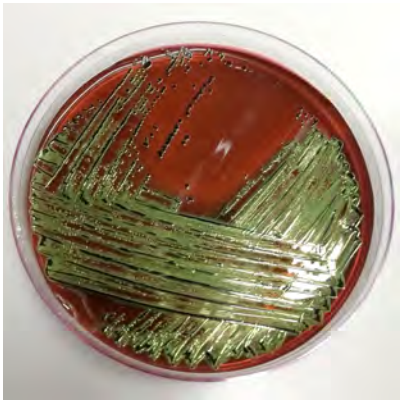
Ian Charles, Quadram Institute Director

Tracking the global spread of antimicrobial resistance

An international team led by Alison Mather has provided valuable new information about what drives the global spread of genes responsible for antimicrobial resistance (AMR) in bacteria. Examining the whole genome sequences of around two thousand resistant bacteria showed that different types of AMR genes varied in their temporal dynamics, providing new information to combat AMR.

The project was supported by the Joint Programming Initiative on Antimicrobial Resistance, a global collaboration tasked with protecting the world population from the risks that spread of AMR poses. This study shows how AMR is transmitted so will help inform the design of new interventions to prevent this.

bit.ly/QI23A01



A Double Bind for Cancer

Hitting two targets at the same time may be the key to stopping the spread of aggressive cancers, according to research led by Stephen Robinson. Tumour growth in mice could be stopped by simultaneously targettinng two signalling switches that trigger angiogenesis, the growth of new blood vessels.

The hope is that this could lead to improved therapies that target multiple proteins to achieve a synergistic anti-cancer response and restrict tumours' abilities to escape therapy.

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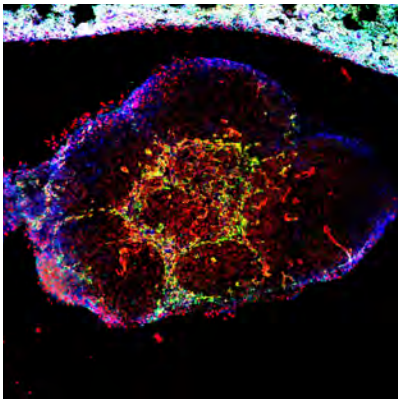

A tumour nodule immuno-fluorescently labelled to investigate angiogenesis with blood vessels in red and NRP1 & 2 in green and blue.

How resistance to bacteriophages shapes *Salmonella* populations

Rob Kingsley and colleagues from the Quadram Institute and University of East Anglia have uncovered how resistance to bacteriophages helped drive emergence of the dominant strains of *Salmonella* currently circulating in livestock and the food chain.

bit.ly/QI23A03

Norfolk prostate cancer study finds place for broccoli in reducing progression

Scientists and clinicians from the Quadram Institute and Norfolk and Norwich University Hospital (NNUH) have shown that a compound derived from brocolli that is linked to reducing the risk and progression of prostate cancer accumulates in prostate tissue, providing evidence for how the protection may work.

bit.ly/QI23A04

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

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Naming unnamed species of bacteria in the age of big data

Mark Pallen and colleagues have adopted an efficient, high-throughput, big-data approach to generate well-formed names for 65,000 microbes, to help cope with a backlog of species being discovered through DNA sequencing.

bit.ly/QI23A05

'Playbook' sets out ways to fight back against antimicrobial resistance

Mark Webber and a team of microbiologists from the University of Birmingham have detailed the 'AMR playbook' that bacteria use to evade the effects of antibiotics, also highlighting what research is needed to develop urgently needed new treatments.

bit.ly/QI23A06

Emergence of antimicrobial resistance in bacteria tracked in real time

Cutting-edge single-cell genomics techniques being pioneered at the Earlham Institute have allowed scientists to watch bacteria developing antimicrobial resistance in real-time providing new and urgently needed avenues to tackle the rise of superbugs.
bit.ly/QI23A07

The arms race at the heart of diseases

A new review by Tom Wileman has pulled together what's known about one critical aspect of how our bodies coordinate their defence response to microbial invasion: how cells target invading viruses, bacteria, and other microbes for destruction.
bit.ly/QI23A08

Developing metagenomic methods to monitor microbes in our food

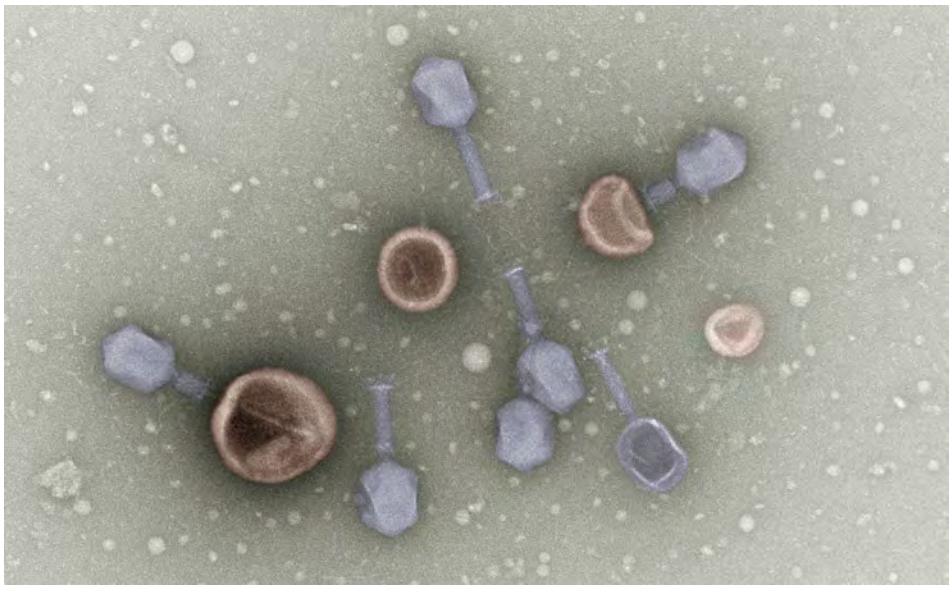
A method for monitoring microbes in food developed at the Quadram Institute uses metagenomics to sample and identify all of the microorganisms present, by efficiently depleting DNA from the food items themselves. Overcoming this barrier to metagenomic sampling should help improve our understanding of food safety and antimicrobial resistance.
bit.ly/QI23A09

What is the best way to store bread?

This question, posed to Marina Corrado by a member of the public, sparked a research project on how storage affects the characteristics of regular white bread, in comparison with bread made from a new type of wheat flour that is high in amylose, making it slower to digest.
bit.ly/QI23A10

Phage of Enlightenment

Bacteriophages in the microbiome are the focus of a new project that will uncover how they interact with the gut to influence health. Evelien Adriaenssens has received funding from the Biotechnology and Biological Sciences Research Council (BBSRC) to study how these viruses that infect bacteria contribute to a healthy gut microbiome, in collaboration with Nathalie Juge and Lindsay Hall.
bit.ly/QI23A11



Transmission electron micrography of bacteriophages (blue). Image by Adriaenssens Group, Quadram Institute Bioscience

Major investment for faecal microbiota transplant facility in Norwich

Work has now started on a new facility in the Quadram Institute for faecal microbiota transplants that will extend treatment of people with recurrent *Clostridioides difficile* (C. diff) infection and support research into the treatment of other microbiome-associated health conditions, including a clinical research study funded by the charity Invest in ME Research on myalgic encephalomyelitis (ME). The charity have also committed to funding the first Invest in ME Research Postdoctoral Fellowship, which will support Katharine Seton to continue her ME research career at Quadram. Katharine has also been awarded a Solve M.E. Ramsay Research Grant to better understand premature ageing of the immune system in people.
bit.ly/QI23A12 https://www.investinme.org/

Diet and Health innovation boosted by new funding and partnership

A new Innovation Hub for research into biofortification is being launched on the Norwich Research Park. Biofortification is the development of crops, foods, feed and fodder with higher levels of nutrients. The Biofortification Hub will strengthen the UK's position as a world-leader in research and commercialisation of biofortification, supporting efforts to enhance diets and ensure sufficient sustainable nutrition for all. .
bit.ly/QI23A13

First UK Food Safety Research Network projects funded to deliver safer foods

The first projects to be funded by the UK Food Safety Research Network (FSRN) have been selected to address real-world challenges to food safety.
bit.ly/QI23A14

£1.8m study into IBS food supplements launches

Fred Warren and Hannah Harris are part of a new study led by the University of Nottingham that will investigate how new cellulose-based food supplements could help people with Irritable Bowel Syndrome (IBS).
bit.ly/QI23A15

Baking biscuits for research; an experience in industry

As part of her PhD studying dietary fibre, Kathrin Haider spent time on a placement with the ingredient research team at Mondelēz making fibre enriched food products.
bit.ly/QI23A16

Quadram Institute scientists support Big C Nourish & Nurture Programme

Food scientists at the Quadram Institute are supporting a 12-week patient-centred nutrition and wellness intervention programme for individuals living with cancer. They have provided healthy recipes and nutritional information on plant-based diets for the programme developed by Norfolk cancer charity Big C, funded by NHS Charities Together.
bit.ly/QI23A17

Prof. Nathalie Juge appointed Quadram's Deputy Chief Scientific Officer

Nathalie Juge's appointment to the scientific leadership team will be pivotal to the development of the Institute's strategy.
bit.ly/QI23A18

Quadram communications team wins top public relations awards

The Quadram Institute communications team has won two Chartered Institute of Public Relations awards for the digital and social media campaign supporting recruitment to the CoPS Study into COVID-19 persistence in the gut.
bit.ly/QI23A19

I went to an LGBTQ+ STEM community and careers conference, here's what I learned

PhD student Gabriel Astorga attended a national event in London to mark the international day of LGBTQIA+ people in Science, Technology, Engineering and Maths (STEM).
bit.ly/QI23A20

Science Soundbites

Muhammad Yasir has launched Science Soundbites: An Audio Paper Series in which he talks to fellow researchers about recently published papers, providing a convenient and accessible way to keep up to date with current research.
bit.ly/QI23A21

Are you aged 18 or over and live within 40 miles of Norwich? You can take part in our research studies. Find out more at quadram.ac.uk/volunteer

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