

Quadram Institute

Summer 2021

Quadram
Institute

Science • Health •
Food • Innovation



Welcome to the newsletter of the Quadram Institute.

In this edition, we have a focus on the microbiome, with a look at some of the recent findings coming out of our research in this area, as well as exciting new projects on its links to health.

The Quadram Institute's mission is to deliver healthier lives through innovation in gut health, microbiology and food. The microbiome unites these areas, and so puts it central to what we do.

Our approach is based on understanding the interactions within the microbiome, and between the microbiome and our bodies, the food we eat, and the wider environment that we share. Understanding the role of the microbiome in health can then be translated into therapies, products and advice that will benefit us all.

Developing the Quadram Institute was an opportunity to assemble the necessary interdisciplinary research expertise and translational elements needed to understand how food and microbes interact to promote health and prevent disease. Quadram has cemented local collaborations, bringing bioscientists and bioinformaticians, clinicians, patients and clinical researchers together under one roof, whilst capitalising on the world-leading cluster of institutions on the Norwich Research Park.

The research profiled in this edition of the newsletter provides a snapshot of how this is coming to fruition, and how we are answering some of the key questions in microbiome research: how does the microbiome establish and persist? How does its composition, and the activities of those microbes influence our health?

Much of this research relies on ongoing collaborations across the Norwich Research Park, the UK and the world. In the spirit of fostering collaboration and sharing expertise, I am very pleased to see the launch of our Best Practice in Microbiome Research website. This is the product of a lot of coordinated work from many people to provide free access to state-of-the-art protocols that have been developed, optimised and applied to microbiome studies across the Quadram Institute. We hope that you will find this a useful resource that will continue to develop over time, mirroring the rapidly evolving field of microbiome research.

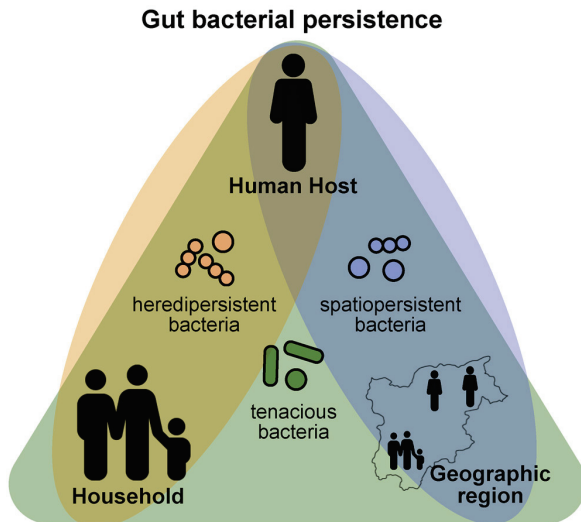
quadram.ac.uk/best-practice-in-microbiome-research/

Ian Charles, Quadram Institute Director

Study shows how persistence pays off in the human gut microbiome

Falk Hildebrand led a study that has highlighted the different strategies that have evolved to enable bacteria to persist in the human microbiome. Understanding how different bacterial species persist over periods of years will help identify and inform the most appropriate strategies for influencing microbiome composition.

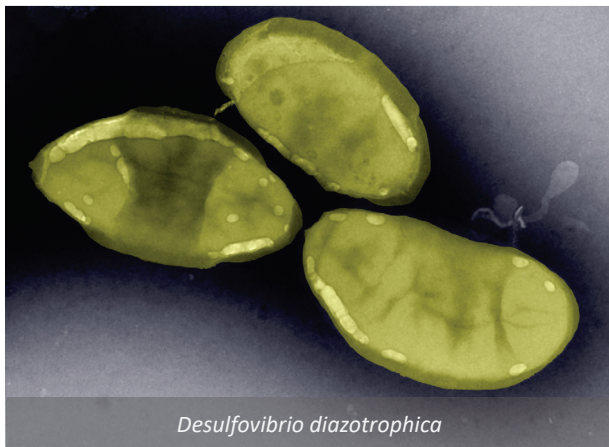
bit.ly/QJ21B01



New species discovered in the human gut microbiome could improve nitrogen availability

Quadram Institute researchers have discovered a new species of bacterium in the human gut that can convert nitrogen into a biologically useful form. This intriguing finding opens up the possibility that these bacteria could provide us with vital amino acids when dietary nitrogen is limited.

bit.ly/QJ21B02



Defining the Parkinson's microbiome strengthens links to gut health

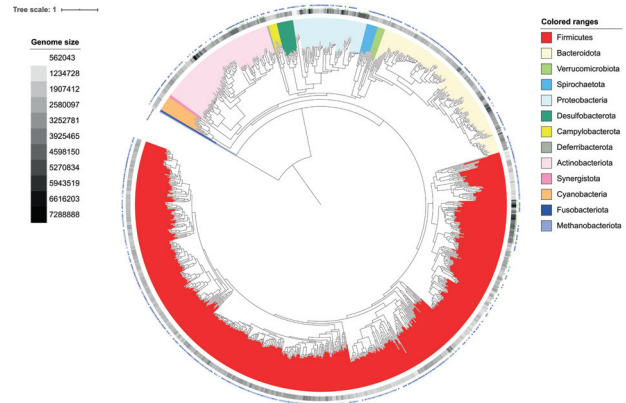
A meta-analysis of the gut microbiome in Parkinson's Disease has provided the clearest picture to date of the changes associated with the condition, providing evidence that alterations in the microbiome could trigger the gastrointestinal problems seen in patients.

bit.ly/QJ21B03

What lives inside the chicken gut?

The extensive microbial diversity within the chicken gut microbiome has been revealed by a team led by Mark Pallen. Their analysis more than doubles the number of bacterial species known to reside in the chicken gut, providing a valuable genomic resource for future studies of this important livestock ecosystem.

bit.ly/QJ21B04



A cooperative community – new project defining how the microbiome shares vitamin B12 for mutual benefit

Nathalie Juge and Martin Warren have received a £500,000 grant from the Biotechnology and Biological Sciences Research Council (BBSRC) to understand how the very few bacteria in the gut microbiome that make vitamin B₁₂ do this, and how it benefits other microbes, and our health.

bit.ly/QJ21B25

New microbiome and breast cancer study in Norwich

A research team from the Quadram Institute, University of East Anglia (UEA) and the Norfolk and Norwich University Hospital (NNUH) have launched one of the few clinical trials to date exploring the gut microbiome and breast cancer. The aim is to underpin the development of new treatments and technologies that will improve the outcome for patients

bit.ly/QJ21B06

Quadram researchers join study into whether the microbiome predicts response to immunotherapy

Quadram Institute researchers have joined a collaborative team investigating whether the microbiome can be used to predict how breast cancer patients will respond to immunotherapy. It's hoped that this will help tailor future treatments, personalised for each patient.

bit.ly/QJ21B07

New project to combat antimicrobial resistance in the skin microbiome

Mark Webber is leading a new project on the risk to humans and animals of antiseptic tolerance in the skin microbiome. This will help combat the rise of antimicrobial resistance and help protect the most vulnerable from dangerous infections.

bit.ly/QJ21B08

To mark a year since the first lockdown in response to the COVID-19 pandemic, we reflect on how Quadram rose to the challenge as part of the UK's response to the virus, and how we overcame challenges, especially in clinical research, but also in all of our daily lives.

This Unrelenting Pandemic

A photo essay looking back at the Norwich Research Park COVID-19 testing facility and how sequencing coronavirus genomes in the Quadram Institute has helped in the local, national and international fightback against the pandemic. bit.ly/QI21B09

COVID-19: How are new variants named?

Mark Pallen was part of a WHO working group on creating neutral names for SARS-Cov-2 variants. Here, he describes how he came to be involved in the team and the pitfalls they encountered along the way. bit.ly/QI21B10

Rising to the challenge: managing clinical trials during a pandemic

Discover how researchers and participants are making a real difference. See how they have ensured a new COVID-19 vaccine becomes a reality; tracked the virus in the gut; embraced remote practices; and pivoted their research to offset the challenges of the pandemic. bit.ly/QI21B11

Lockdown One Year On: Fascinating stories from the Quadram community

We asked our Quadram community to share one item that summarises their year from lockdown. What emerged was fascinating stories and experiences that many of us can relate to bit.ly/QI21B12

New defence against viral lung infections discovered

Tom Wileman and his team at Quadram and UEA have helped uncover a previously unknown arm of the immune defence system that protects the lung from lethal viral infections. This points the way to new drugs that increase resistance at the lung surface, particularly against viruses like SARS-CoV-2 and influenza. bit.ly/QI21B13

Uncovering how physical structure of dietary fibre underpins its benefits to health

A new study from Quadram's Cat Edwards and colleagues at King's College London has shown how food processing changes the structure of dietary fibre, altering its nutritional value. They are using this understanding to develop fibre-rich food ingredients and products targeted at helping manage blood glucose, and so maintain health and reduce disease risk. bit.ly/QI21B14



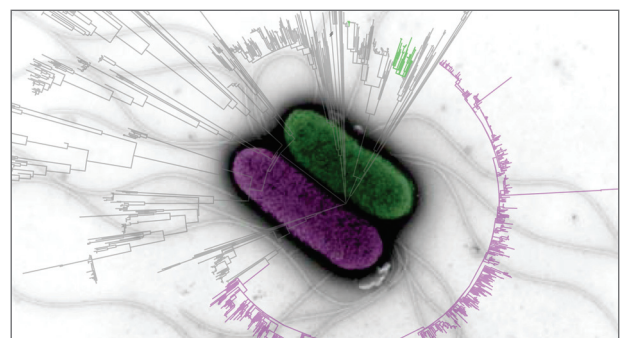
Microscopy image showing different dietary fibre structures in wheat endosperm and chickpea cotyledon.

Image by Cathrina Edwards, Quadram Institute

Genome sequencing reveals how *Salmonella* carves out a niche in pork production

Rob Kingsley from Quadram and colleagues from the Roslin and Earlham Institutes have made a detailed genomic survey of *Salmonella* variants and shown that, despite being extremely closely related, variants can have very different effects on the health of the pig and also represent very different risks to food safety.

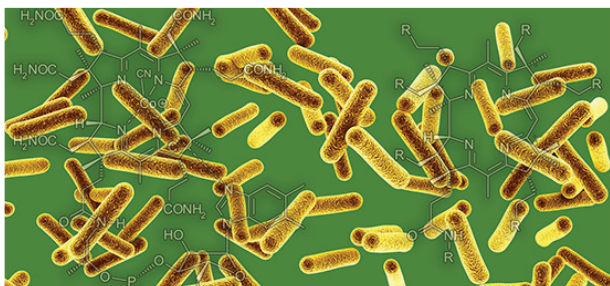
bit.ly/QI21B15



Addressing the vitamin B12 insufficiency pandemic

New findings could improve the biomanufacturing of vitamin B12 and represent an affordable way to produce supplements and overcome a problem for vegans that plants do not make this vitamin which is essential for the health.

bit.ly/QI21B16



The best in AI appointed at Norwich Research Park

Scientists across Norwich Research Park institutes are part of a major integrated UK research-industry programme led by The Alan Turing Institute, seeking out the best talent in AI and data science, developing bioscience leaders and supporting the UK economy.

bit.ly/QI21B21

Pint Of Science Norwich Goes Virtual for 2021

The UK's Pint of Science festival went online for 2021, with scientists across the Quadram Institute and Norwich Research Park bringing their research to screens worldwide. Quadram hosted an event with the local scientists working to combat breast cancer.

bit.ly/QI21B22

Quadram Institute scientists funded to build international partnerships

Quadram's global outlook has been boosted with support from BBSRC's international partnering awards. Alison Mather has been granted two of these prestigious awards to build collaborations with researchers in New Zealand and The Netherlands. Additionally, Matthew Gilmour and Evelien Adriaenssens have each been granted partnership awards to collaborate with researchers in Canada.

bit.ly/QI21B19 and bit.ly/QI21B20



Alison Mather



Matthew Gilmour



Evelien Adriaenssens

New website launched for Norwich's health research biobank

The Norwich Research Park Biorepository, a biobank for health research, has launched a new website designed to help the public learn more about donating tissue samples to help advance medical research.

bit.ly/QI21B17



New building named after microbiologist Dr Ella Barnes OBE completed on Norwich Research Park

The £5m Ella May Barnes building, providing state-of-the-art laboratories and workspace at Norwich Research Park, is complete. Dr Ella May Barnes OBE was a leading microbiologist at the Norwich Food Research Institute, now the Quadram Institute

bit.ly/QI21B18

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