Quadram Institute

Summer 22

Quadram Institute
Science Health
Food Innovation

Welcome to the newsletter of the Quadram Institute

This edition of the newsletter highlights recent ground-breaking research that's starting to unpick how the gut microbiome influences health. This is a major focus of our research strategy, with recent studies published ranging from the microbiome's influence on pregnancy to the development of chronic disease, through to how it affects hallmarks of ageing. This impactful science has benefited from interdisciplinary collaborations with our partners on the Norwich Research Park, and beyond.

Collaboration is vital to ensure science meets the challenges of the 21st century, so I am delighted that the new Food Standards Agency and BBSRC supported UK-wide Food Safety Research Network will be hosted here at the Quadram Institute; working together we will apply cutting-edge scientific knowledge to the food industry.

At the time of writing, we are about to submit proposals to renew our Biotechnology and Biological Sciences Research Council (BBSRC) Institute Strategic Funding. We are very excited about how our proposals promote health and reduce threats in the food system. The proposals include some exciting new collaborations with partners and other BBSRC-funded institutes and have synergies with the government's current goal to improve population health.

I am pleased that Martin Warren has taken up a key new role as Quadram's Chief Scientific Officer. Congratulations also to Lindsay Hall, Alison Mather and Mark Webber on their richly deserved UEA professorships, which reflect the excellence of the science undertaken by our researchers; and also to Rob Kingsley and the wider team on winning UEA's Innovation and Impact Award for outstanding impact in policy for their domestic and global work on sequencing SARS-CoV-2.
bit.ly/QI22B

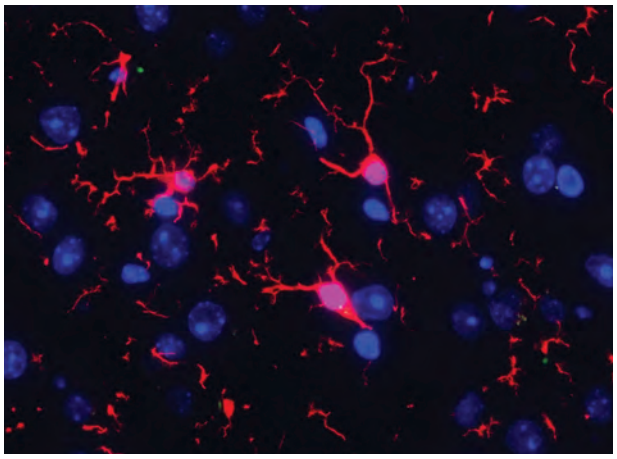
As an institute, we can also now celebrate receiving an Athena SWAN Bronze Award. Thanks to everyone involved in getting the Quadram Institute to this important milestone and putting in place the action plan that cements our commitment to ensuring inclusivity and equality.
bit.ly/QI22B00

Ian Charles, Quadram Institute Director

Prof Robert Kingsley, Prof Alison Mather and Prof Justin O'Grady (COVID sequencing)
Image credit: Fisheye Images

Faecal transplants reverse hallmarks of ageing

Transplanting faecal microbiota from young into old mice can reverse hallmarks of ageing in the gut, eyes, and brain, according to ground-breaking new research from Aimee Parker, Simon Carding and colleagues from Quadram Institute and University of East Anglia. This provides evidence for the direct involvement of gut microbes in ageing and the functional decline of brain function and vision and offers a potential solution in the form of gut microbe replacement therapy.
bit.ly/QI22B01



Microscopy image showing inflammatory cells (red) in the aged brain

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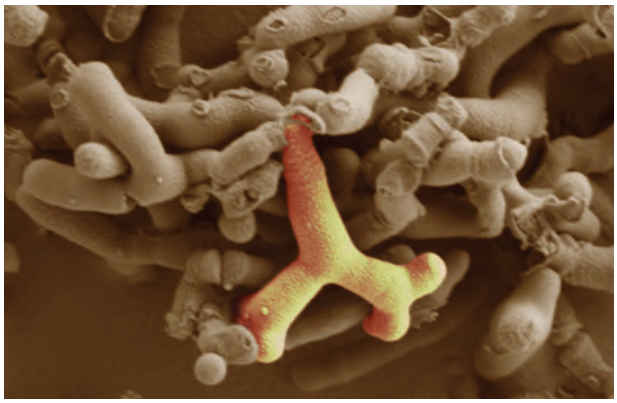


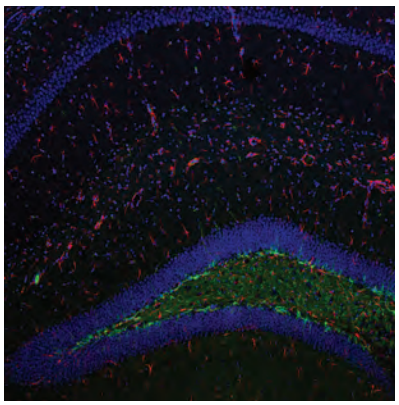
Maternal microbiome promotes healthy development of the baby

Lindsay Hall's group and colleagues from the University of Cambridge have found the first evidence of how a mother's gut microbes aid the development of the placenta and the healthy growth of the baby. *Bifidobacterium breve*, given to germ-free mice, altered the mother's metabolite profile, which affects nutrient transport from mother to baby.
bit.ly/QI22B02

Bifidobacterium breve

How do microbes living in our gut modulate brain and behaviour?

Nathalie Juge's group, and colleagues at the University of East Anglia uncovered the role of a key member of the gut microbiome in influencing communication between the gut and the brain. These results provide insights into the mechanisms linking gut microbes with neurological disorders through the production of metabolites
bit.ly/QI22B03



Granule cells (labelled green) in the brain hippocampus are affected by *R. gnavus*

Deciphering gut microbiome 'chatter' to combat IBD

Simon Carding and Tamás Korcsmáros' research groups have developed a new computational biology method to better understand how communication between the microbiome and the immune system, mediated by bacterial extracellular vesicles affects Inflammatory Bowel Disease (IBD) to help deliver targeted clinical treatments.
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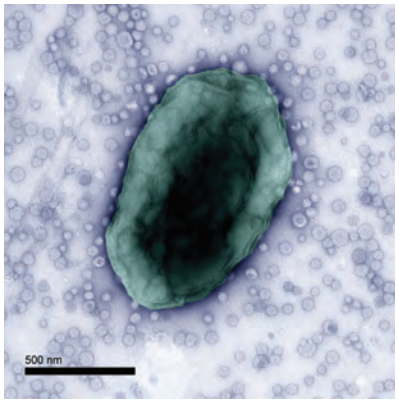


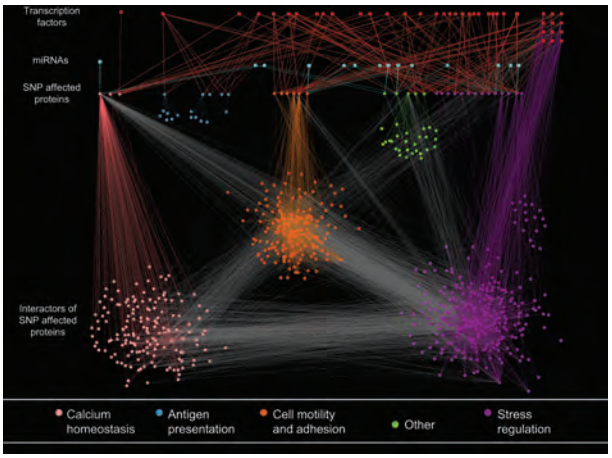
Bt and BEVs with Bacterial cell releasing vesicles. Image by Rokas Juodeikis Quadram Institute and Ian Brown University of Kent

New research has helped unravel the role of a key molecule in cholestatic liver disease

Naiara Beraza and her team have shown that found that a key metabolic regulator, SIRT 1, triggers cells in the immune system to attack liver cells, progressing cholestatic liver disease, which may open up the way to vitally needed new therapies to tackle the condition.
bit.ly/QI22B05

Uncovering hidden genetic connections for personalised medicine

A new precision medicine tool discovers hidden genetic connections in cellular signalling networks behind IBD and other complex conditions. Developed with the Earlham Institute and the Norfolk and Norwich University Hospital, the systems genome approach identifies which of several pathways to disease a patient has, allowing more effective diagnosis and more personalised treatments.
bit.ly/QI22B06



Visualisation of the signalling network associated with IBD

Genomic surveillance spotlights *Salmonella* in Brazilian poultry

Genomic surveillance for *Salmonella* in Brazilian chicken by Alison Mather, Nabil-Fareed Alikhan and colleagues has shown how changes in chicken rearing have altered the profile of *Salmonella* bacteria found circulating within the poultry industry.
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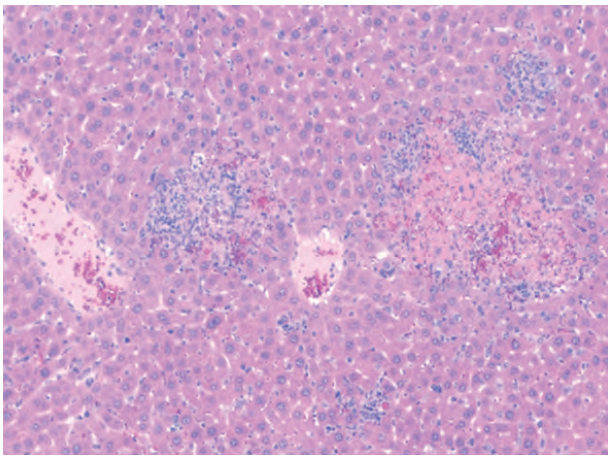

How the body uses fat to fight infection

New research from the University of East Anglia and Quadram Institute reveals how our immune cells use the body's fat stores to fight infection. This information could help develop new approaches to treating people with bacterial infections
bit.ly/QI22B08

Salmonella infecting liver cells

Blood and guts: new link uncovered between the gut microbiome and blood groups

Nathalie Juge and her team have discovered that a common member of the human gut microbiome has a specific preference for blood group A antigens. This may give it an advantage when foraging for sugars, allowing it to colonise the gut more easily.
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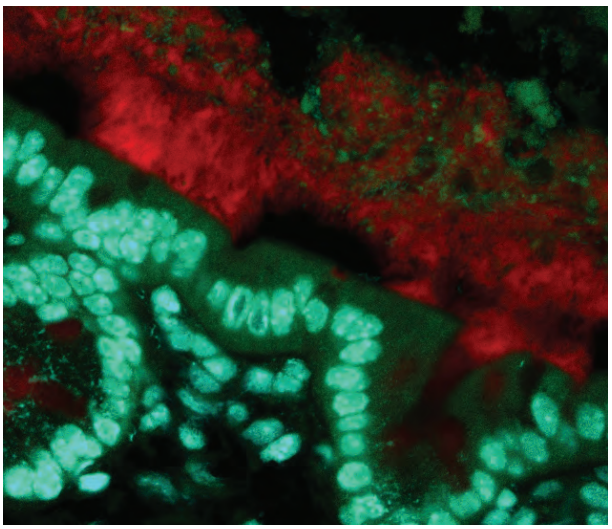

Ruminococcus gnavus (green) in the mucus layer (red) of the gut lining (gut cell nuclei are blue). Image by Laura Vaux

Coronavirus jams communication signals to immune cells in the gut

A computer model could help to reveal how some infectious diseases, including COVID-19, trigger an overactive immune response in certain patients, which can drive inflammation and lead to serious complications or even death.
bit.ly/QI22B10

How the body fights back against cancer

Our immune system can be triggered to attack cancer cells, according to a new study of acute myeloid leukaemia. Immune cells known as macrophages could be programmed to attack the cancer cells, which has potential to improve future treatments.
bit.ly/QI22B11

Bacteria linked to aggressive prostate cancer

Researchers have identified five types of bacteria linked to aggressive forms of prostate cancer. It is hoped that these findings could lead to treatments that target these particular bacteria and slow or prevent the development of aggressive disease.
bit.ly/QI22B12

How cranberries could improve memory and ward off dementia

A clinical study has highlighted the neuroprotective potential of cranberries for health. The research team hope that their findings could have implications for the prevention of neurodegenerative diseases such as dementia.
bit.ly/QI22B13

Study identifies essential genes for bacterial survival in biofilms

Using a newly-developed genetic sequencing platform, TraDIS-Xpress, Mark Webber, Ian Charles and colleagues have discovered the genes used by bacteria to live within biofilms. This could be useful to help prevent biofilms and the infections they cause.
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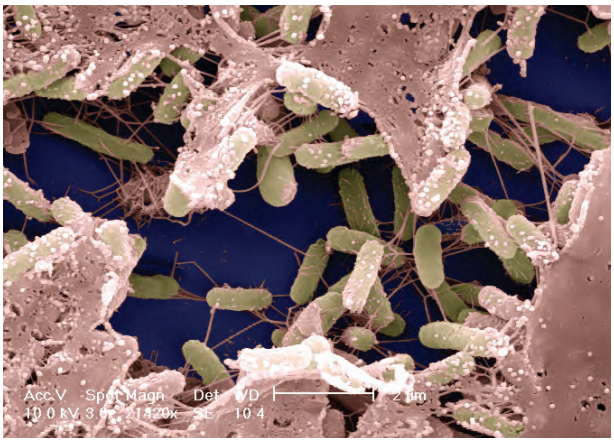

Salmonella Bacteria in biofilm

New study into how broccoli influences blood sugar levels launched in Norwich

People in Norfolk with pre-diabetes are being recruited to a study to understand how eating broccoli can help normalise their blood sugar levels.
bit.ly/QI22B15

Quadram Institute hosts new Food Safety Network tackling £9 billion food safety challenge

The Food Standards Agency and Biotechnology and Biological Sciences Research Council have invested £1.6m into a new Food Safety Research Network, hosted by the Quadram Institute and led by Matt Gilmour.
bit.ly/QI22B16

Funding boost for QI Clinical Research Facility

The National Institute for Health Research has awarded NNUH £1m to drive forward innovation in experimental medicine and translational research including supporting research in the Clinical Research Facility in the Quadram Institute.
bit.ly/QI22B17

Eagle Genomics and Quadram Institute's new strategic partnership to accelerate microbiome analysis through AI-augmented knowledge discovery platform

Eagle Genomics and the Quadram Institute have formed a new partnership that will facilitate understanding of complex relationships between microbiome, food and other factors, including potential causes of health and disease.
bit.ly/QI22B18

Collaboration key to tackling challenges, as Norwich scientists meet Nuffield Farming Scholars

Bushra Abu-Helil was invited to be a 'walking encyclopaedia' at the Nuffield Contemporary Scholars Conference which brought together 150 future farming leaders.
bit.ly/Q22B19

Entering the Dragon's Den of the Biotech Industry

An enterprising group of students from the Quadram Institute entered this year's global YES competition, successfully progressed to the final and won the People's Choice Award.
bit.ly/QI22B20