Quadram Institute

Summer 2019

Quadram Institute
Science Health Food Innovation

Welcome to the newsletter of the Quadram Institute.

This is an exciting time, as 300 scientists and support staff have moved into our new building. These researchers will be studying food, microbes and the gut to get a better understanding of how these interact to influence our health.

This move brings excellent science and research programmes strategically funded by the Biotechnology and Biological Sciences Research Council, under the same roof as a major new endoscopy unit and the Clinical Research Facility of the Norfolk and Norwich University Hospital. This is a unique partnership in a fantastic new building and presents us with huge opportunities to improve our understanding of the impact of food on health, and particularly how this influences healthy ageing for the UK population.

We also welcome into the institute, groups from the University of East Anglia led by Justin O'Grady, Stephen Robinson, John Wain and Tom Wileman, strengthening existing collaborations in food and health.

The first human study involving all of the QI partners has started, investigating the effects of phytic acid on the microbiome. We have also launched the PEARL Study, led by Lindsay Hall. We are recruiting 250 pregnant women to a long-term study to better understand the influence of the microbiome on health in pregnancy and early life of the infant.

As well as local partnerships across the Norwich Research Park, we remain committed to being internationally-recognised and to work across borders to tackle global challenges in health and diet. We are involved in two projects funded by the European Institute of Innovation & Technology (EIT). These will further develop the digital personalised nutrition platform QUISPER, and fermented seaweed-based novel feed additives. I was delighted to sign a Memorandum of Understanding with the University of Newcastle, Australia, and look forward to developing cooperation in our shared interests around food security, food safety, gut health and the microbiome.

Ian Charles, Quadram Institute Director

Professor Kevin Hall, Senior Deputy Vice-Chancellor, the University of Newcastle, Australia and Professor Ian Charles

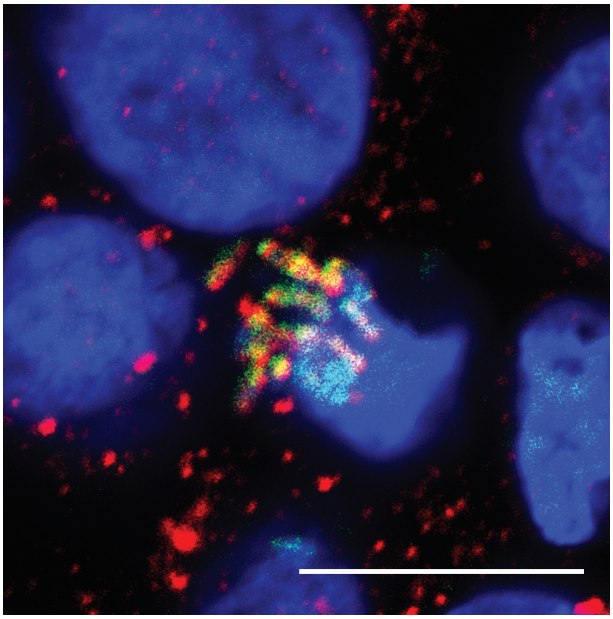
Interdisciplinary approach uncovers new clues to triggers of gut inflammation

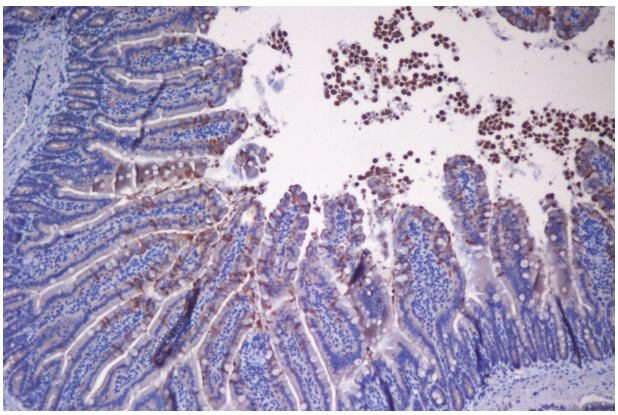
The cellular processes that occur at the onset of gut conditions are complex and understanding them requires an interdisciplinary approach. Tamás Korcsmáros, a group leader at QI and the Earlham Institute, and his team have combined microbiology, cell biology with network analysis and computational biology to understand autophagy. This is a key process in the defence against pathogens and maintaining healthy cells at the gut lining. Impaired autophagy has been implicated in inflammatory conditions such as Crohn's Disease. A new network analysis combined with data from cell organoid studies has identified 18 cellular processes linked to impaired autophagy in Paneth cells of the gut lining.
bit.ly/QI17911

Evolutionary arms race pits our cellular defence mechanisms against invading bacteria

A further study provides the first systematic overview of how autophagy has evolved to combat pathogens, showing how an arms race has developed with pathogens evolving ways of fighting back against autophagy. This may give clues to what is behind the successful invasion strategy of certain gut pathogens like *Salmonella*.
bit.ly/QI18115

Salmonella bacteria tagged green associating with a cellular autophagy protein (red). Image by Isabelle Hautefort and Anne-Claire Jacomin





Characteristic folds and projections (villi) of the intestinal lining. Cells undergoing apoptosis (dying and detaching) in response to inflammation are stained brown. Image by Aimee Parker

Abnormal cellular process implicated in gut inflammation and onset of Inflammatory Bowel Disease

Elevated levels of the key cellular process of apoptosis have been implicated in intestinal inflammation and inflammatory bowel disease (IBD) in a new study from the Quadram Institute. A combination of cellular analysis and mathematical modelling gave a better understanding of the way the gut lining renews in healthy and in inflammatory conditions. Apoptosis, a process used to remove cells, is increased in chronic inflammatory conditions, which are also characterised by impaired renewal of the gut lining. The researchers believe that these results give an indication of the early events preceding the onset of IBD.
bit.ly/QI17845

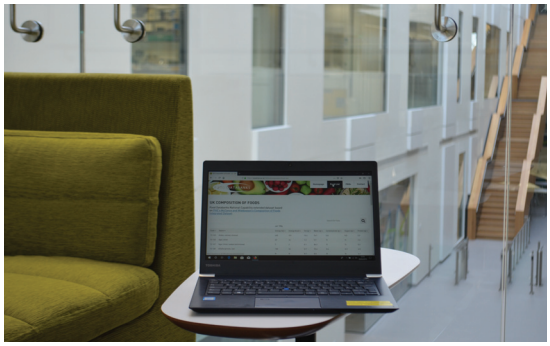
$1.2 Million Grant for One Health approach to study bacteria behind diarrheal disease

John Wain is playing a key part in a new project developing the most comprehensive picture yet of the emergence and transmission of *Campylobacter* bacteria, in rural Bangladesh. With funding of $1.2 Million from The Bill & Melinda Gates Foundation, the project will take a One Health approach, analysing human, behavioural, animal and microbial metagenomic data to identify where new interventions would most effectively prevent *Campylobacter* transmission. The project is led by the Milken Institute School of Public Health at the George Washington University and will involve working with The Child Health Research Foundation (CHRF) in Dhaka. CHRF have been involved in an ongoing surveillance study in Mirzapur, Bangladesh since 2007.
bit.ly/QI17967

An interview in the field site in Mirzapur, Bangladesh

New test to combat buffalo mozzarella fraud uncovers mislabelled products

Kate Kemsley and colleagues have launched a new test to differentiate between buffalo and cow's milk. The test uses Multiple Reaction Monitoring Mass Spectrometry (MRM MS) to identify characteristic differences in the amino acid composition of αs1-casein proteins. Applying the test to commercial products, they found that many restaurant meals and supermarket pizzas claiming to be buffalo mozzarella are mislabelled.
bit.ly/QI17950



New searchable UK composition of foods website available

Food Databanks, in collaboration with Public Health England, has launched a new UK Composition of Foods Integrated Dataset (CoFID) searchable website. The website allows users to search the current McCance and Widdowson dataset. First published in book form in 1940, CoFID contains reference data on the levels of nutrients in thousands of the most commonly eaten foods in the UK.
bit.ly/QI17950

New method released that standardises simulation of digestion

Cathrina Edwards contributed to a new standard method for simulating the digestion of food developed by 27 different partner institutes collaborating in the EU-funded COST Action INFOGEST. The method has been designed and validated as a tool for researchers wishing to understand how changes to the composition or structure of food affect its digestion in the body.
bit.ly/QI18124

Lindsay Hall awarded prestigious WH Pierce Prize by the Society for Applied Microbiology

Lindsay Hall has won the WH Pierce Prize, which is awarded by the Society for Applied Microbiology to a young microbiologist who has made a substantial contribution to the science of applied microbiology.
bit.ly/QI18031

Alison Mather recognised as one of the UK's Movers and Shakers in BioBusiness 2018

Alison Mather has been named as one of 50 female leaders in healthcare business in the UK. Produced by BioBeat, *50 Movers and Shakers in BioBusiness* emphasises the current role of women in leading, inspiring and innovating to ensure new technologies and treatments continue to improve UK research, health and society. Alison was recognised as a rising star for developing revolutionary bioscience products for healthcare.
bit.ly/QI16575

Award recognises fruitful collaboration with Jiangsu Province, China

Arjan Narbad has received a prestigious award by China's Jiangsu Province. The competitive award is presented to foreign nationals who have made significant contribution or formed successful collaborations with Jiangsu Province. Arjan was nominated by Jiangnan University, with whom he has helped to establish the UK-China Joint Centre for Probiotics Research. The two organisations initiated the UK-China Joint Centre for Probiotics Research in 2016, supported by the Newton Fund. Their latest study has highlighted how different strains of probiotic bacteria differed in their ability to restore the microbiota of mice that had received antibiotics.
bit.ly/QI17467

Gareth Taylor, Prof. Chen Wei, Prof. Arjan Narbad, Bronte Zhang

Quadram Institute students develop their entrepreneurial skills

Three postgraduate students have been developing their entrepreneurial skills as part of the UEA/NRP i-Teams programme that gives early career researchers the chance to develop entrepreneurial expertise and gain skills and experience outside of their academic pursuits. Jenna Helleur, Emad Shehata and Jasmine Percival took part developing marketing and commercial opportunities from existing research projects.
bit.ly/QI18249

Quadram Institute Artist in Residence will bring together the worlds of art and science

The first Artist in Residence has joined the Quadram Institute on a mission to enable scientists and the public to explore microbial science by making art. Artist Jennie Pedley will be hosting workshops for scientists, in schools and for the public in a Norwich library. Model worlds created by bringing together scientists and the public will go on display at the Norwich Science Festival in October.
bit.ly/QI18430

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