Oxford Metabolic Health Inaugural Symposium

Monday 2 July 2018

Richard Doll Lecture Theatre, Richard Doll Building, Old Road Campus, Oxford, OX3 7LF

08.40 – 09.00 **Registration**

09.00 – 09.10 **Welcome and Introduction to OMH and its activities from Professor Mark McCarthy**

09.10 – 10.45 **Session 1. Chair: Professor Mark McCarthy**

09.10 – 09.30 Professor James McCullagh
'Using untargeted metabolic profiling by mass spectrometry to elucidate changes in metabolism associated with disease'

09.30 – 09.50 Professor Damian Tyler
'Lost in clinical translation - finding new ways to image metabolism'

09.50 – 10.10 Dr Carmelo Velardo
'Mobile health for gestational diabetes management'

10.10 – 10.30 Professor Jonathan Emberson
'The Mexico City Prospective Study: a blood-based cohort study of 150,000 adults followed for 14 years'

10.30 – 10.45 **Oral presentation selected from submitted abstracts**
Dr Gustavo Bezerra
'Novel drug discovery for inborn errors of metabolism by substrate reduction'

10.45 – 11.30 **BREAK and poster session number 1**

11.30 – 12.50 **Session 2. Chair: Professor Kieran Clarke**

11.30 - 11.50 Professor Cecilia Lindgren
'Lessons learned while sketching out the genetic blueprint of obesity'

11.50 – 12.05 Dr Ana Domingos
'Sympathetic Neuroimmunity in Obesity'

12.05 – 12.25 Dr James Cantley
'Insights into ACC1-coupled metabolic signalling in islet function'

12.25 – 12.45 Professor Anna Gloyn
'Oxford NIHR Biomedical Research Centre and its role in Oxford Metabolic Health'

12.45 – 13.05 Professor Susie Dunachie
'The interaction between diabetes and global infection'

13.05 – 14.20 **LUNCH and poster session number 2**

14.20 – 14.50 **Oral presentations selected from submitted abstracts**

14.20 – 14.35 Debbie Malden
'Adiposity and ischaemic heart disease in the UK Biobank: a prospective study of 500,000 men and women'

14.35 – 14.50 Dr Agata Wesolowska-Andersen
'Exploring the extremes of the baseline type 2 diabetes phenotypes spectrum'

14.50 – 16.35 **Session 3. The interface between the immune system and metabolism Chair: Professor John Todd**

14:50 -15:15 Professor Katja Simon
'Autophagy and metabolism in immune differentiation and homeostasis'

15.15 -15.40 Dr Lucy Davison
'Functional investigation of the DEXI gene in type 1 diabetes'

15.40 – 16.10 **BREAK**

16.10 – 16.35 Professor Fiona Powrie
'Host microbe interaction in the intestine in health and disease'

16.35 – 17.20 **Keynote Lecture**
Professor Sir Steve O'Rahilly, Metabolic Research Laboratories, University of Cambridge
'Some observations on the causes and consequences of obesity'

17.20 – 17.30 **Concluding remarks and presentation of poster prizes**

17.30 – 18.00 **Drinks reception and discussion time**

Speakers

Keynote Speaker

Professor Sir Steve O'Rahilly, FRS, FMedSci, *Metabolic Research Laboratories, University of Cambridge*

'Some observations on the causes and consequences of obesity'

Steve O'Rahilly is Director of the MRC Metabolic Diseases Unit and Co-Director of the Wellcome Trust-MRC Institute of Metabolic Sciences, University of Cambridge. He is interested in the aetiology and pathophysiology of human metabolic and endocrine disease and how such information might be used to improve in the diagnosis, therapy and prevention of these diseases. His work established that mutations in single genes could result in severe human obesity and that these defects largely acted through disruption of central satiety mechanisms. These and other findings have uncovered several previously unrecognised genetic causes of obesity and type 2 diabetes, including some that are amenable to specific treatment.

Professor James McCullagh, *Head of the Mass Spectrometry Research Facility, Chemistry Research Laboratory (CRL), Department of Chemistry*

'Using untargeted metabolic profiling by mass spectrometry to elucidate changes in metabolism associated with disease'

James McCullagh leads a research group that develops and applies novel analytical tools to help understand environmental, genetic and proteomic influences on cell chemistry and metabolism in plants, microorganisms, animals and humans. Working on a range of sample types including cells, tissues and bio-fluids, his group specialises in measuring changes in central metabolism including metabolic pathways such as glycolysis, gluconeogenesis, citric acid cycle, pentose phosphate, amino acid pathways and those associated with nucleic acid metabolism. In addition to his research activities, James is head of the Mass Spectrometry Research Facility in the CRL.

Professor Damian Tyler, *Department of Physiology, Anatomy and Genetics (DPAG)*

'Lost in clinical translation - finding new ways to image metabolism'

Damian Tyler is Associate Professor of Biomedical Science and a British Heart Foundation Senior Research Fellow. Having moved to Oxford in 2001 from the University of Nottingham where he gained a doctorate in Medical Physics, he has built up extensive experience in the development and application of Magnetic Resonance Imaging and Spectroscopy (MRI/MRS). His research has been based on the study of cardiac structure, function and metabolism in normal and diseased hearts using MRI/MRS. He is developing the technique of Dynamic Nuclear Polarisation, which can be used to visualise ^{13}C-labelled cellular metabolites in vivo as well as their enzymatic transformation into other species, to study cardiac metabolism in the human heart. He is an associate member of the Cardiac Metabolism Research Group in DPAG and leads the Oxford Metabolic Imaging Group.

Dr Carmelo Velardo, *Institute of Biomedical Engineering, Department of Engineering Science*

'Mobile health for gestational diabetes management'

Carmelo Velardo is Senior Researcher in Digital Health at the Institute of Biomedical Engineering and Departmental Lecturer at the Department of Engineering Sciences. Over the past 8 years, his work has spanned topics of signal processing for novel biometric and biomedical applications, with recent research focusing on the use of mobile-health solutions to support patients with chronic conditions. He has designed and developed a customisable, scalable client-server platform to allow engineers and clinicians to set up mobile-health interventions quickly and reliably. His work has been used in several randomised controlled trials and is now part of GDm-health, one of the first apps to go through the NICE app endorsement process.

Professor Jonathan Emberson, *Clinical Trial Service Unit & Epidemiological Studies Unit, Nuffield Department of Population Health*

'The Mexico City Prospective Study: a blood-based cohort study of 150,000 adults followed for 14 years'

Jonathan Emberson is an Associate Professor in Medical Statistics and Epidemiology, and Senior Statistician at the Clinical Trial Service Unit and Epidemiological Studies Unit (CTSU). He joined CTSU in 2004 after completing his undergraduate degree in Mathematics and postgraduate degrees in Statistics and Epidemiology. He is CTSU's principal investigator for the Mexico City Prospective Study of 150 000 middle-aged Mexican adults. His main research interests are studying the causes and prevention of cardiovascular disease, with a particular emphasis on large-scale individual participant meta-analyses of both observational and randomised studies.

Dr Gustavo Bezerra, *Metabolism and Organelle Biogenesis, Structural Genomics Consortium*

'Novel Drug Discovery for Inborn Errors of Metabolism by Substrate Reduction'

Gustavo Bezerra completed his PhD in protein crystallography at the University of Graz in Austria before moving to the University of Vienna/Max F. Perutz Laboratories as a member of the Vienna International PostDoctoral Program (VIPS). He joined the group of Professor Wyatt Yue (Metabolism and Organelle Biogenesis) at the Structural Genomics Consortium one year ago as a senior scientist. He is a biochemist with competencies in structural biology and biophysical methods.

Professor Cecilia Lindgren, *Big Data Institute and Nuffield Department of Medicine*

'Lessons learned while sketching out the genetic blueprint of obesity'

Cecilia Lindgren is Professor of Genomic Endocrinology and Metabolism. She received her PhD working at Lund University, spending some time at the Whitehead Institute, MIT, USA. She moved to Oxford in 2006, obtaining a Wellcome Trust Career Development Fellowship shortly afterwards. She has received many awards including the first Leena Peltonen Prize for Excellence in Human Genetics in 2013 for her work on applying genetics and genomics to dissect the aetiology of type 2 diabetes, obesity and fat distribution. In her current work, she uses these approaches to identify genetic variants influencing regional fat distribution and to illuminate some of the biological pathways involved.

Dr Ana Domingos, *Department of Physiology, Anatomy and Genetics (DPAG)*

'Sympathetic Neuroimmunity in Obesity'

After her first degree in Mathematics in Lisbon, Ana Domingos completed her PhD in neurobiology with Leslie Vosshall at The Rockefeller University in New York. Staying at Rockefeller, she undertook postdoctoral research with Jeffrey Friedman, where she used optogenetic tools to identify a neuronal circuit in the brain mediating the reward value of sugar. In 2013, she moved to the Gulbenkian Institute in Lisbon to establish the Obesity Laboratory. Her lab is interested in the function of the nervous system in weight control and was the first to visualise the long-time conjectured peripheral neuron-adipose junctions in the adipose tissue. She has received awards from the Human Frontiers Science Program and EMBO and in 2017 became a Howard Hughes Medical Institute International Research Scholar. She takes up an Associate Professorship in DPAG from July 2018.

Dr James Cantley, *Department of Anatomy, Physiology and Genetics*

'Insights into ACC1-coupled metabolic signalling in islet function'

James Cantley is an RD Lawrence Fellow, funded by Diabetes UK, a research fellow at Wolfson College and a lecturer in medicine at Christ Church College. His current research interests are based around the beta cell – how insulin secretory capacity is matched to demand during health and obesity, and how this fails during type 2 diabetes. Before coming to Oxford in 2013, he undertook a PhD on the molecular control of beta cell function in the lab of Dominic Withers at UCL and then worked as a postdoctoral fellow in the lab of Trevor Biden at the Garvan Institute of Medical Research in Sydney.

Professor Anna Gloyn, *Oxford Centre for Diabetes, Endocrinology and Metabolism (OCDEM) and Wellcome Centre for Human Genetics (WCHG), Nuffield Department of Medicine, and the NIHR Biomedical Research Centre*

'Oxford NIHR Biomedical Research Centre and its role in Oxford Metabolic Health'

Anna Gloyn is Professor of Molecular Genetics and Metabolism and a Wellcome Trust Senior Fellow in Basic Biomedical Science based jointly at OCDEM and WCHG. Her research is focused on using naturally occurring mutations in humans as tools to identify critical regulatory pathways and insights into glucose homeostasis and beta cell function. The current focus of her research is on translating genome-wide association signals into molecular mechanisms for diabetes and clinically useful tools. Anna is an active member of many international consortia and her work has been recognised nationally and internationally through many awards. She is the Lead for the 'Diabetes and Metabolism' theme within the Oxford Biomedical Research Centre.

Professor Susie Dunachie, *Centre for Tropical Medicine and Global Health, Nuffield Department of Medicine*

'The interaction between diabetes and global infection'

Susie Dunachie is an Associate Professor, Wellcome Trust Intermediate Clinical Fellow and Honorary Consultant in Infectious Diseases and Medical Microbiology. Her research has established expertise in cellular immunology in tropical countries to address key questions that further vaccine discovery and immunogenicity monitoring. Current diseases of interest include melioidosis, scrub typhus and malaria. She has become interested in understanding why people with diabetes are particularly susceptible to melioidosis and is using an immunology laboratory she set up at the Mahidol Oxford Tropical Medicine Research Unit to further these studies. In the Tropical Immunology laboratory at the Peter Medawar Building in Oxford, her group uses cutting-edge approaches to characterise the immune response to tropical pathogens.

Ms Debbie Malden, *Clinical Trial Service Unit, Nuffield Department of Population Health*

'Adiposity and ischaemic heart disease in the UK Biobank: a prospective study of 500,000 men and women'

Debbie is a second year DPhil student at the Nuffield Department of Population Health. After completing her BSc (Hons) in Biomedical Science at the University of Aberdeen, Debbie received an MSc in Global Health Science from the University of Oxford in 2016. Her main research interest is obesity and the effects on health, particularly cardiovascular disease. For her DPhil project, she is investigating adiposity measures in relation to ischemic heart disease risk in the UK Biobank population of 500 000 adults.

Dr Agata Wesolowska-Andersen, *Wellcome Centre for Human Genetics*

'Exploring the extremes of the baseline T2D phenotypes spectrum'

Agata Wesolowska-Andersen is a senior postdoctoral research scientist in the McCarthy lab at the Wellcome Centre for Human Genetics. She received her PhD in Bioinfomatics from the Technical University of Denmark and then worked as a postdoctoral research associate at the National Jewish Health hospital in Denver, CO. Her main research interests include application of machine learning techniques and integration of multi-omics data to advance the understanding of complex diseases, in particular type 2 diabetes.

Professor Katja Simon, *Kennedy Institute of Rheumatology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences*

'Autophagy and metabolism in immune differentiation and homeostasis'

Katja Simon is Professor of Immunology and leads a group at the Kennedy Institute. She trained under Avrion Mitchison at the DRFZ Berlin and then moved to the Centre d'Immunologie Marseille Luminy. During her second postdoc in Oxford, she pursued her interest in cell fate, study cell death molecules in thymic selection, inflammation and tumour immunity. She set up a research programme to investigate autophagy, another cellular process determining cell fate, in the haemato-immune system. Her group discovered that autophagy, the main conserved cellular bulk degradation pathway, maintains healthy red blood cells, stem cells and memory T cells and promotes differentiation while preventing ageing of the haematopoietic system.

Dr Lucy Davison, *Wellcome Centre for Human Genetics, Nuffield Department of Medicine*

Functional investigation of the DEXI gene in type 1 diabetes

Lucy Davison is an MRC Clinician Scientist Fellow at the Welcome Centre for Human Genetics. She is also a vet and undertakes clinical work and research at the Royal Veterinary College in London. She is particularly interested in the role of genes and environment in susceptibility to type 1 diabetes across a range of species.

Professor Fiona Powrie, FRS, FMedSci, *Kennedy Institute of Rheumatology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences*

'Host microbe interaction in the intestine in health and disease'

Fiona Powrie is the Director of the Kennedy Institute of Rheumatology and Principal Investigator in the Translational Gastroenterology Unit, University of Oxford. Her research interests include characterisation of the interaction between the intestinal microbiota and the host immune system and how this mutualistic relationship breaks down in inflammatory bowel disease. Her work has identified the functional role of regulatory T cells in intestinal homeostasis and shed light on their development and mechanism of action. Fiona's current work seeks to translate findings from model systems into the clinic in inflammatory bowel disease patients. Fiona has received numerous awards including the Louis-Jeantet Prize for Medicine 2012.