

INform

January 2015

ISSUE 1



The fungal microbiome in asthma

The NIHR Leicester Respiratory Biomedical Research Unit focuses on promoting the development of new and effective therapies for the treatment of respiratory diseases including severe asthma and chronic obstructive pulmonary disease (COPD). This research project demonstrates how laboratory work can influence health care in the future, particularly for asthmatic patients who have allergies to fungi in the environment.

Asthma is a common condition where the breathing tubes become narrowed. This narrowing occurs on some occasions but not others (episodic) and can be relieved by medications. The medications are a combination of drugs which relax the spasm of the smooth muscle around the breathing tubes that causes some of the narrowing (bronchodilators) and inhaled steroids that dampen down the inflammation that causes the spasm. In most cases of asthma the airway narrowing and inflammation are caused by an allergic reaction to a protein that is breathed in. This can come from pollens, furry animals, dust mites and fungal spores. In some people, particularly those whose asthma starts as an adult, no evidence of allergy can be found and we don't know what causes the asthma.

Continued on page 2

From Bench to Bedside

It's easy to think of science happening in laboratories and libraries, and imagine Professors and Doctors at conferences discussing their latest findings. The real importance of science though, is in its ability to shape healthcare and society. In healthcare research, this means saving lives and improving the quality of life.



There are three research units in Leicester and Leicestershire that work not just to discover new information about health and illness, but to implement that to change healthcare provision and even your own health behaviours. The three units research lungs, hearts and lifestyle.

Respiratory Diseases (lung diseases)

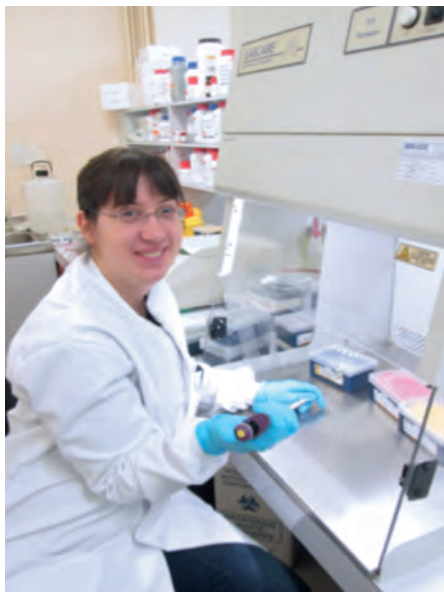
The NIHR Leicester Respiratory Biomedical Research Unit focuses on promoting the development of new and effective therapies for the treatment of respiratory diseases. Our research focusses on two disease areas, Chronic Obstructive Pulmonary Disease and Asthma.

Cardiovascular Diseases (heart diseases)

The NIHR Leicester Cardiovascular Biomedical Research Unit aims to improve the diagnosis, prognosis and treatment of heart illnesses. We are interested in all diseases of the heart and blood circulation including heart attack, heart failure, rhythm problems, stroke, aneurysms, high blood pressure and valve disease. Our research focuses on genetics and new treatments.

Lifestyle, diet and physical activity

The NIHR Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit was funded in 2012, to explore and develop innovative lifestyle interventions to help prevent and treat chronic disease. *"Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63 percent of all deaths."* World Health Organization



Eva at work in the laboratory

*We have been particularly interested in finding out what **fungi** people with **asthma** are allergic to...*

We are particularly interested in the role of fungi in asthma. Fungi are very common and some of them can grow at body temperature which means they can grow in the lungs. This can cause a mixture of allergy and infection and may lead to lung damage over time where the breathing tubes become permanently narrowed (fixed airflow obstruction) and they have difficulty fighting off infection (bronchiectasis). We have been particularly interested in finding out what fungi people with asthma are allergic to and whether it is present in the phlegm (sputum) they cough up. However quite a lot of fungi are difficult to culture and identify using a microscope. We have been awarded a grant by Asthma UK and the Henry Smith Foundation for a PhD studentship to use what are called 'molecular methods' (sequencing of the DNA from the fungi), to find out exactly what fungi are in the lungs of asthmatics including those where there doesn't seem to be an allergic cause for their asthma. We will get samples from the lung either from the sputum or by putting a camera into the lungs (bronchoscopy). This approach is called studying the 'fungal respiratory microbiome'. As well as finding out exactly what fungi are



present in people with known fungal allergy we hope to find unusual fungi that could explain why some people who don't appear to be allergic have got asthma. If we find such fungi it may be possible to remove them with anti-fungal antibiotics which may help control the asthma. Alternatively we might be able to reduce the exposure of people with asthma to the fungi which are causing the problem. We have appointed a PhD student Eva-Maria Rick to carry out the work which will be done in collaboration with a clinical fellow Kerry Woolnough. Eva obtained her Bachelor double degree at the Hochschule Bonn-Rhein-Sieg in Applied Biology as well as at the University of Aberdeen in Genetics/Immunology in 2013. She completed a Masters degree in Immunology at the University of Aberdeen in 2014 and started with us in October. The research will be carried out over the next four years. This work is also supported by the Respiratory BRU which is funding Kerry's salary and by the Midlands and Asthma Allergy Research Association which has provided a five-year fellowship for Catherine Pashley.

Andy Wardlaw

Professor of Allergy and Respiratory Medicine and BRU Director

Dr Catherine Pashley

Research fellow and head of the mycology and aerobiology group

Search 

for **NIHR Leicester Biomedical Research Units**

Would you like to have a say in our research projects? Join our patient and public groups.

Contact Rebecca on rp237@le.ac.uk or 0116 204 4737.

Cardiovascular BRU

www.le.ac.uk/bru

Diet Lifestyle and Physical Activity BRU

www.ll.dlpa.bru.nihr.ac.uk/

Respiratory BRU

www.leicsrespiratorybru.nihr.ac.uk/



Positive asthma study

5.4 million people in the UK are affected by asthma, and every 10 seconds someone has a potentially life threatening asthma attack. Many severe asthma sufferers have persistent symptoms and attacks which impact on them, their families and can affect society due to days off work and healthcare costs. Therefore, asthma affects us all and new safe and effective treatments are required.

Asthma is an inflammatory disease, with inflammation of the breathing passages (airways) mainly caused by eosinophils which are a special type of white blood cell. Steroids are the usual treatment for asthma and reduce the inflammation caused by eosinophils, but this inflammation is not always stopped by steroids or the dose of steroids required to be effective is so high that the steroid treatment itself can cause long-term problems. The Respiratory BRU recently investigated a new medicine called QAW039. QAW039 is not a steroid, but instead aims to block the way the eosinophils move into the airway as well as the movement and activation of other cells thought to be important in asthma.

Results found the study drug to be effective in that it was safe and well tolerated.

The study compared the study medicine to a placebo (dummy tablet). The study results were very positive. Results found the study drug to be effective in that it was safe and well tolerated. Results showed that the eosinophils in the sputum were reduced and overall asthma control was improved. This was also reflected in an improvement of patients' quality of life, shown using health questionnaires. Also, the study showed an improvement in patients lung function.

Professor Brightling concludes:

'We were delighted to find that the study drug was safe and it worked. This is an important break-through for asthma. Although further studies need to be undertaken to confirm these positive findings and to test whether the drug can reduce asthma attacks in studies of longer duration – this really could be the first step towards a new safe and effective tablet for asthma'.

In September 2014, Professor Brightling held an evening meeting for all study participants. At this meeting Professor Brightling and the research team thanked study participants for their time and participation and also presented the results of the research. Participants were thrilled to find out about the results of the study and that their participation was part of such a successful study.



Dr Berair presents the research to the study participants



Dr Hartley shows the study participants some of the images of the lungs obtained from the study

New [facebook](#) Page

We have a new facebook page called NIHR Leicester Biomedical Research Units (which includes all three units)

Cardiovascular BRU

Diet Lifestyle and Physical Activity BRU

Respiratory BRU

Reducing Risk of Heart Illness in People with Pre-Diabetes



New research highlights the importance of regular physical exercise for maintaining heart health and delaying the onset of type 2 diabetes.

The Diet, Lifestyle and Physical Activity BRU based in Loughborough and Leicester explores how our own behaviour affects our health and might make us ill.

People with impaired glucose tolerance can reduce their risk of cardiovascular disease by 8% simply by walking an additional 2,000 steps a day, a large international study says. Impaired glucose tolerance is where the body cannot remove sugar from the blood very well. A person with impaired glucose tolerance has too much sugar in their bloodstream, but not so much they have diabetes.

Impaired glucose tolerance is a precursor to type 2 diabetes, affects 79 million Americans, according to the Centers for Disease Control and Prevention. Worldwide, the figures are even more staggering – with researchers saying 344 million people are currently affected, and this number is set to rise to 472 million by 2030.

Led by Dr. Thomas Yates, from the University of Leicester in the UK, the latest study analyzed data collected from 9,306 adults from 40 countries.

The findings, published in *The Lancet*, suggest that an extra 20 minutes of moderate exercise, such as walking, reduces the risk of heart attack and stroke by 8%.

Dr. Yates explains:

"People with impaired glucose tolerance have a greatly increased risk of cardiovascular (heart) disease. While several studies have suggested that physical activity is beneficially linked to health in people with impaired glucose tolerance, this is the first study to specifically quantify the extent to which change in walking behaviour can modify the risk of heart disease, stroke, and cardiovascular-related deaths."

Analysing data originally collected for a research project called the NAVIGATOR trial, the researchers focused on the 9,306 adults who had impaired glucose tolerance and cardiovascular disease, or at least one cardiovascular risk factor. All the participants received information aimed at losing weight, cutting dietary fat intake and increasing physical exercise to 150 minutes per week.

The researchers noted the average number of steps each participant walked per day – as recorded by a pedometer – over a week at the start of the study and again 1 year later. They found that participants who had increased their exercise by walking an extra 2,000 steps each day had a 10% lower risk of cardiovascular disease than the previous year. They also found that every 2,000 step increase or decrease in walking activity from that originally recorded was associated with an additional 8% lower or higher cardiovascular event rate.

Dr. Yates adds:

"Our results provide new evidence that changing physical activity levels through simply increasing the number of steps taken can substantially reduce the risk of cardiovascular disease, such as heart attack and stroke. Importantly, these benefits are seen regardless of bodyweight status or the starting level of activity."

The study notes that lifestyle changes provide the foundations for many diabetes prevention programs and walking is known to be the most common and preferred choice of physical activity.

Dr. Yates concludes:

"These new findings provide the strongest evidence yet for the importance of physical activity in high risk populations and will inform diabetes and cardiovascular disease prevention programmes worldwide."

So, while it may not be rocket science, it turns out that a fairly brisk 20-minute walk each day will greatly benefit your heart health and reduce the risk of type 2 diabetes.

Walking has previously been shown to have health benefits, with walking to work reducing the risk of diabetes and heart disease.



Comparing Drugs that Prevent Stroke



In the Cardiovascular BRU we've researched a large range of medicines and devices that are now in use in healthcare. The recently published ROCKET AF study showed that Rivaroxaban is as good as Warfarin at preventing stroke in people with an irregular heart rhythm called *atrial fibrillation*.

This is good news for patients as Warfarin requires frequent visits to the GP or hospital to get the blood-thinning just right, as those of you using Warfarin will know. Getting this just right is so tricky many people using Warfarin are not actually benefitting from it. As a result of this study National and International Guidelines were changed so that patients with the irregular heart rhythm atrial fibrillation and one more risk factor for stroke would usually be given Rivaroxaban for stroke prevention.

New Year's Honour: Professor Sir Samani

British Heart Foundation Chair of Cardiology at the University and consultant cardiologist at Leicester's Hospitals, Prof Nilesh Samani, is recognised for services to medicine and medical research in the New Year's Honours.

Professor Samani, who is British Heart Foundation Professor of Cardiology at Leicester and a Consultant at Leicester's Hospitals, based at Glenfield Hospital, has been honoured for services to medicine and medical research.

Professor Samani said: "I am both surprised and truly delighted to have been awarded this honour. I view it as a recognition of what we have tried to achieve in Leicester – to create a world class clinical and research centre dedicated to improving the treatment of heart diseases. In this endeavour, I have had the privilege of working with excellent colleagues at both the University of Leicester and at Glenfield

Hospital. In this sense the award is as much for them as it is for me. From a personal perspective, I also need to acknowledge the unstinting support of my family who I know are very proud."

Congratulating Professor Samani, University of Leicester President and Vice-Chancellor Professor Paul Boyle said: "This is a great honour for a truly inspirational member of the University community. Professor Samani's world-class research has helped to establish Leicester as an internationally renowned centre of excellence for cardiovascular research.

"His work has a huge impact, not only on the thousands of people he treats locally each year, but for the 2.5million people who live with heart disease in the UK and for the worldwide community who will benefit from the major advances in prevention, treatment and care made possible by his team."

Drug Found to Help Heart Failure

Patients with long-term problems from heart failure, where the heart muscle struggles to pump enough blood round the body, may now be given Ivabradine as well as the usual treatment of drugs called beta-blockers, if the beta-blockers don't work well enough. The SHIFT study, which was done at several places including Leicester, found that in particular patients this drug helps relieve their symptoms.



Sitting Behaviour in Older Adults

As we get older we often get frailer and are more likely to have illnesses, disabilities and mental decline.

Research has demonstrated that exercise can help keep us well and reduce the risk of these problems but sometimes older people struggle to exercise, experience pain and are worried about falling. We want to find out if simply replacing time spent sitting with standing or gentle walking could help. Older adults typically spend 70% of their waking day sitting, but little is known about whether reducing sitting promotes health and wellbeing. The STAND UP research in the Lifestyle BRU is going to focus on investigating the impact of sitting in older adults and we are keen to find out the health effects of reducing sitting time in this age group. Our research includes three work packages:

Measuring Sitting Time

We want to improve the way we measure time spent sitting and doing physical activities in adults over the age of 60 by measuring posture and the amount of energy used, in the form of calories, while participants undertake normal daily tasks (e.g. cleaning, walking, sitting while watching TV, reading, etc.). We will also re-analyse existing data that has been collected as part of the Health Survey for England to investigate how much sitting and physical activity older adults do, when and how often they do these behaviours, and the relationship between health and wellbeing. This data will be supplemented with data that we have collected within our department in a large population of older multi-ethnic adults.

Using Technology to Measure Sitting Time

Work package two will develop and test novel ways of using technology to capture the location of where older adults spend their time sitting around the home environment. This will involve

a wireless device and a number of electronic tags that will be attached to objects (such as sofas, chairs, tables, etc.). We will combine the information from these devices to measure total time spent sitting, the type of sitting behaviour and the location around the home. Participants will be asked how much time they thought they spent sitting and for feedback on these devices, which may help to design future research studies aimed at reducing sitting time in older adults.

Research How Harmful Sitting is

We will investigate how harmful sitting is for health in older adults and whether this can be improved by reducing long periods of sitting with regular and short periods of standing or walking. This will involve a laboratory study to compare the impact of sitting down all day (condition one) with reducing sitting

by standing for five minutes every 30 minutes (condition two) and reducing sitting by walking for five minutes every 30 minutes (condition three). Participants will come into the laboratory and perform each of these conditions on three separate days. During these conditions, blood sugar, insulin, fats in the blood, sleepiness, mood and cognitive performance will be measured. This project is explained in more detail in the Acute Study story.

Chief Investigator:

Dr Thomas Yates

Co Investigators:

Dr Charlotte Edwardson

Dr Jason Gill

Dr Danielle Bodicoat

Professor Melanie Davies

Professor Kamlesh Khunti

Professor Naveed Sattar

Professor Stuart Biddle

Dr Latha Velayudhan

Dr Dale Esliger

Professor Alan Sinclair

Funder: This research is funded by the Lifelong Health and Wellbeing (LLHW) initiative led by the Medical Research Council.

Simple Urine Test to Identify when Patients are not Taking Medications

Researchers from the Cardiovascular Biomedical Research Unit have led a study looking at drug compliance for patients taking drugs to lower their blood pressure, which has been published in the medical journal Heart.

The team led by Dr Maciej Tomaszewski analysed the samples for a wide range of the most commonly prescribed drugs to treat high blood pressure and found that a quarter of people evaluated at a hypertension clinic either did not take their medicines at all, or only took them some of the time – resulting in higher blood pressure.

The researchers analysed the urine samples of 208 patients with high blood pressure attending a specialist hypertension clinic. One hundred and twenty five of the patients were new referrals from primary care; 66 were follow up patients whose blood pressure control was poor; and 17 had been referred for other reasons.

The findings suggest that in order to keep blood pressure low, patients need to be consistent in taking their medication.

ACUTE Study

– Does breaking sedentary time improve glucose regulation in women with impaired glucose tolerance?

The number of people diagnosed with Type 2 diabetes is increasing rapidly and about 2.6 million people in the UK currently have diabetes. Having Type 2 diabetes puts people at a high risk of having heart problems, kidney failure and complications resulting from nerve damage in the eyes and feet.

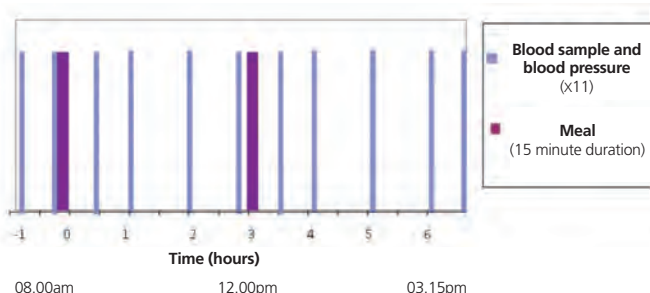
With this in mind, our research team at the Lifestyle BRU are interested in developing new ways to prevent diabetes. There is increasing evidence suggesting that prolonged sitting time (sedentary time) may actually increase the risk of diabetes. However, going from sitting to standing and carrying out light-intensity activities (such as casual walking), may reduce diabetes risk. We were keen to find out whether reducing the amount of time people spend sitting and replacing it with either standing or light intensity activity reduced sugar and fat levels, therefore reducing the risk of diabetes. The ACUTE study was designed to answer these questions. Participants were sedentary, overweight or obese, women aged 50-75 who had gone through the menopause and had problems breaking down sugar in their body (impaired glucose tolerance).

Participants carried out 2 of the following 3 conditions in a random order.



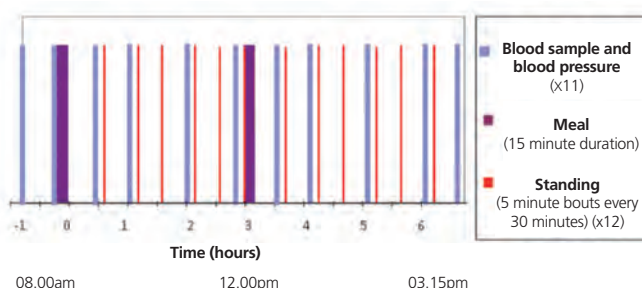
Treatment Condition A: Sitting

Condition A is what we call the 'sitting' condition. Participants remained seated throughout the entirety of the test period (7 hours) whilst watching TV/DVD's/reading. We provided participants with a standardised meal for breakfast. Whilst they were sitting, we took blood samples (using a cannula) and blood pressure across the course of the morning. We then provided another standardised meal and continued taking blood samples and blood pressure after lunch. In total, we took 11 blood samples over the 7 hour testing period



Treatment Condition B: Standing

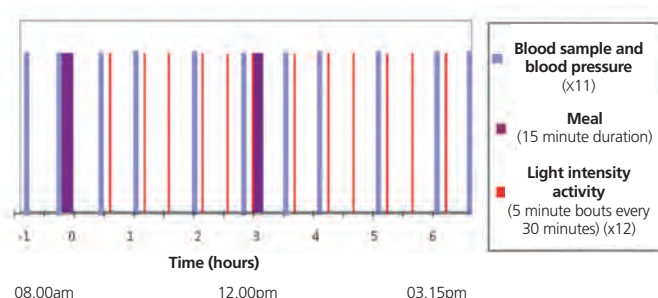
Condition B is the 'standing' condition. Participants went through exactly the same process as condition A but instead of sitting for 7 hours they were asked to undertake 5 minute bouts of standing activity (in close proximity to their chair) every 30 minutes following breakfast. The same process was repeated after lunch. In total, they accumulated 12 bouts (60 minutes) of standing throughout the test period of 7 hours.



Treatment Condition C: Walking

Condition C is the 'light activity' condition. Participants went through exactly the same process as condition A but in addition they are asked to undertake 5 minute bouts of light walking on a treadmill (equivalent to around 2.5mph) every 30 minutes following breakfast. The same process was repeated after lunch. In total they accumulated 12 bouts (60 minutes) of light-intensity treadmill walking throughout the test period of 7 hours.

We successfully recruited all participants between October 2013 and November 2014. In total, we had 22 participants who completed the trial and results are expected in early 2015.



Would you like to take part in a research project?

We're conducting a study to understand how the fat gene can influence our health and body shape.

We're looking for volunteers to visit our lab for just under one hour to undergo measurements of body composition, DNA and diet and lifestyle factors. Volunteers must have the following characteristics:

- Male from European descent
- Non-smoking
- 18-35 years of age
- Minimal weight change (< 3 kg) in last 3 months
- Not taking any medication

Following this visit, volunteers may or may not be invited back to see how a bout of exercise can influence gut hormones and health risk factors. This will specifically comprise of three visits to our lab: a familiarisation trial, an

exercise trial and a control trial. The familiarisation trial will assess fitness levels and familiarize individuals to measures of the study. The exercise and control trials are main trials where participants visit the lab for a day. On the exercise trial, participants perform a one hour run; on the control trial, participants will rest. Throughout the day, participants will be provided meals while we take intermittent samples of blood, measures of appetite and food intake. Participants will be paid should they are invited back.

All volunteers will receive:

- Personalized information on genetic results
- Feedback on their body fat percentage and body composition

If you are interested please contact Alison Stanley on 01509 226445 or a.stanley@lboro.ac.uk

Meet the Team

Meet the Team

During the New Year, the research team will be out and about with Clinical Commissioning Group (GP) colleagues. Find us on the Health Bus at:

Thurmaston ASDA	14th January 2015
Loughborough Market	15th January 2015
Hinckley Market	16th January 2015
Morrisons Coalville	17th January 2015
Tesco Ashby	19th January 2015
Woodland Garden Centre, Hinckley	20th January 2015

Public Lecture Series

Join us at Loughborough University for one (or all) of our public lectures.

Exercise and Cardiovascular Disease
January 20th 2015

Sedentary Behaviour and Health
February 10th 2015

Young People and Type 2 Diabetes
March 17th 2015

Exercise for Patients with Kidney Disease
May 12th 2015

Exercise: Living Longer and Dying Quicker
September 8th 2015

Lifestyle and Liver Disease
October 20th 2015


Obesity: Do Your Genes Fit?
November 10th 2015


This lecture will be delivered in: Lecture Theatre HE0.10, Clyde Williams Building, Loughborough University, LE11 3TU


Full directions are available on: www.lboro.ac.uk/about/findus.html

Refreshments are available from 6:30pm. Each lecture will start at 6:45pm and anticipated finish time will be between 8:30-9:00pm.

To book your place please email: a.stanley@lboro.ac.uk or telephone 01509 26445

 Like us on Facebook
NIHR Leicester Biomedical Research Units

 Follow us on Twitter
Cardiovascular BRU @LeicesterBRU
Respiratory BRU @NIHR_LRBRU
Diet, Lifestyle and Physical Activity BRU @activitybru

 Watch our video's on Vimeo
NIHR Leicester Respiratory BRU



University Hospitals of Leicester
NHS Trust

