Genetic Research

Genetic research is really important. Not only does it help us work out who is at risk of heart illnesses and how much risk they have, but increasingly allows us to choose treatments most likely to work for that individual and to introduce measures that will help prevent illness before it occurs.

To do genetic research we need two things; data and DNA. Scientists, supported by a wide range of specialists, need access to health information matched to genetic data so they can explore which genes are linked to risk in the long term. The biggest challenge in this field of research is around the quantity of health information and DNA required. Whilst good research can happen with about 10,000 people giving us access to this information and a sample of their blood, really powerful research needs about twice that number of participants.

Regular readers will know we already have a number of sample and data projects running at the Leicester NIHR Biomedical Research Unit including BRICCs and the Family Heart Study. Seeking to achieve this large collection of samples and data a new project is starting in Leicester City GP Practices.

The GENVASC project will be delivered through another local initiative, which may you have heard of through the local or even national newspapers; NHS Health Checks. People aged over 40 are being encouraged to have their heart health checked with their GP. In Leicester City people who take advantage of this important provision will also be invited to donate some extra blood and allow researchers access to their medical records. We hope that within five years we can achieve 20,000 participants.

Doing genetic research in Leicester offers advantages to find out about genetic risks because the population is so diverse. It’s really important that we get participants from lots of different ethnic backgrounds if we’re going to deliver good healthcare, based on solid scientific understanding, to everyone in the future.

When most people think about genetic research they probably picture a laboratory and a scientist in a white coat. Whilst there are certainly lab-coat wearing scientists in the team here, work on this scale also involves a lot of other people behind the scenes.

This project will involve doctors, nurses, phlebotomists and other health professionals in GP Practices asking people to take part in the project and making sure that some extra blood is collected when they have their NHS Health Check. The blood is then collected by NHS Logistics drivers who take blood from GP Practices to the NHS Pathology Labs at the hospitals to be tested. The Pathology staff then separate the different blood samples and the blood donated for our research project gets taken to the research facility at Glenfield Hospital. In the research facility the blood is processed and stored by our own scientists. Data is collected direct from electronic medical records using software developed by our award winning Informatics Team allowing us to move data securely, and protect your identity.

In five years time, the scientists will get to work supported by administrators, technicians and statisticians to find out which genes are linked to risk of heart illness and how much each gene contributes to an individual’s overall risk.

Successful genetic research requires collaboration and support from a few hundred specialists working in a wide range of roles locally, but most importantly it requires the support of those 20,000 people willing to provide information and blood to the project.
Heart Failure Research

Many of us know someone who has had a heart attack. Heart attacks kill 88,000 people every year (British Heart Foundation). The heart is a muscle and like any other muscle it has a blood supply to make it work. During a heart attack the supply of blood to the muscle is interrupted. This is called ischaemia. If the artery supplying the blood to the heart is successfully unblocked then the blood to the heart is suddenly restored. This is called reperfusion. Both processes cause damage to the heart muscle.

After a heart attack the body’s repair mechanisms kick in. The damaged section of the heart becomes scarred and stretches. To compensate for this the muscle becomes thicker so it can still pump blood around the body. Other processes at a cellular level also become active to overcome the effects of the damage to the heart tissue. Initially this is helpful, but long term it leads to the heart becoming less effective; this is called heart failure. About 27,000 people a year develop heart failure. It causes breathlessness, tiredness, coughing, fluid retention and almost half of people die within a year of diagnosis.

Doctors and nurses treating heart attacks noticed something odd about people who had more than one heart attack. The people who had two heart attacks had less damage than people who only had one. Dr Sadat Edroos has been working at the Glenfield Hospital with the Leicester NIHR Biomedical Research Unit to find out what might cause this.

It seems that people who have a previous heart attack have a chemical in their blood from the earlier heart attack. This chemical seems to make the heart more able to repair itself without developing heart failure.

Sadat worked to develop a cellular model of a heart attack (a heart attack in a petri dish) so he could identify the chemical that seems to be having this effect. His subsequent work has been exploring how we might get this chemical into the blood stream of a patient having a heart attack. He’s been looking at what causes this chemical in the body, and it seems to be possible to produce this chemical by stopping the blood supply to any large muscle in the body, not necessarily the heart e.g. by stopping, for a short time, the blood supply to an arm or leg muscle.

Dr Andrew Vanevis is now joining our team to lead on a new research project looking at whether this effect can limit heart failure if the chemical is induced regularly, by daily stopping the blood supply to an arm or leg using a blood pressure cuff, in people who have already had a heart attack.

Meet Our Fellow Research Units at the University Hospitals of Leicester NHS Trust

Government Investment in Lung Research in Leicester

Respiratory Research at Glenfield Hospital has become one of 20 Biomedical Research Units within England. Professor Andrew Wardlaw, Director of the BRU, led the application and after tough open competition the department has now become part of a multi million pound investment by the National Institute for Health Research (NIHR) to help prevent, diagnose and treat lung disease with the aim of translating medical research into benefits for patients.

The NIHR Leicester Respiratory Biomedical Research Unit is a partnership between the University of Leicester and the University Hospitals of Leicester NHS Trust and funded by the NIHR. The NIHR is part of the Department of Health who provide support and facilities in the NHS for research that results in high-quality care for patients and the public. The Unit will focus on promoting the development of new and effective therapies for the treatment of severe asthma and chronic obstructive pulmonary disease (COPD). The funding will provide infrastructure such as clinical space and specialist staff allowing our researchers to undertake first class investigations into lung disease. Key research areas will include airway inflammation, lung damage, genetics of lung disease, the musculoskeletal system and the development of novel treatments.

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National initiative to examine how \textbf{lifestyle changes} affect long-term health opens for business

The National Institute for Health Research (NIHR) Leicester – Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit (BRU) has opened its doors for business to look at how physical activity, diet and lifestyle can impact upon the prevention and treatment of chronic disease.

State of the art exercise equipment has been installed and new staff have been appointed at both the University Hospitals of Leicester NHS Trust (UHL) and Loughborough University’s School of Sport, Exercise and Health Sciences (SSEHS).

The NIHR Leicester – Loughborough Diet, Lifestyle and Physical Activity BRU was awarded £4.5 million NIHR funding over five years from April 2012 plus £1.38 million capital funding by the Department of Health.

The NIHR Leicester – Loughborough Diet, Lifestyle and Physical Activity BRU will focus on improving health for patients with long term conditions such as diabetes by using and improving upon therapeutic lifestyle interventions. For example, these interventions could increase the amount of movement and physical activity people take part in, reduce time in sedentary behaviours, and use other approaches such as the interplay of exercise and appetite control, and minimising weight re-gain after bariatric (such as gastric band) surgery.

The important work of the BRU will be integrated with and complement the UK’s first ever National Sports and Exercise Medicine Centre of Excellence based at Loughborough University, an Olympic legacy project recently announced by Health Secretary Andrew Lansley.

This new BRU is a collaboration between Loughborough University, one of the leading international institutions in exercise research, University Hospitals of Leicester and the University of Leicester. It provides an opportunity for researchers in the East Midlands to become some of the leading experts internationally in research into lifestyle, and in particular physical activity interventions to both prevent and treat diseases such as diabetes. The funding will create nearly thirty new research posts.

Anne Milton, Public Health Minister said:

“We know that having a good diet and being active can help protect against heart disease, type 2 diabetes and certain types of cancer. That’s why it’s important for us to understand how diet and lifestyle can affect and perhaps treat long-term conditions. The work being carried out by NIHR Leicester-Loughborough BRU will positively benefit patients taking part in the research and will help improve the lives of those living with chronic conditions.”

Professor Dame Sally C. Davies, Chief Medical Officer and Chief Scientific Advisor, Department of Health, said:

“The world-class research undertaken in this NIHR Unit has the potential to directly benefit the health and lives of patients and will also contribute to knowledge that will improve the nation’s health. With the 2012 Olympics now underway, the national and international interest is focused on physical fitness and activity, and the opening of this Unit is particularly welcome and timely.”

Professor Melanie Davies, Professor of Diabetes and BRU Director said:

“Physical inactivity is estimated to be the fourth leading cause of death globally and our research will particularly include subjects from black and minority ethnic groups and young people at the highest risk of chronic diseases. The award of this BRU will allow us to become an International Centre of Research Excellence undertaking the full spectrum of lifestyle research which we believe will make a real difference, not only to people in the East Midlands but nationally and internationally. The award was made after an interview involving international experts from across the world including Australia, Canada, the US and Europe and was a highly competitive process. The award will mean that we will be able to attract and retain some of the leading researchers, nationally and internationally, in this area.”

Want to receive the newsletter regularly and express your views on cardiovascular research? Join our mailing list by emailing rp237@le.ac.uk.

Search Leicester Cardiovascular Biomedical Research Unit Volunteer to join our research review panel.

Contact Rebecca on rp237@le.ac.uk for more information.

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Research Awareness

Staff from the NIHR Cardiovascular Biomedical Research Unit have been out and about talking to the public about research happening at Glenfield Hospital, at the Mallory Mile cycling event and the Hinckley Town Centre Run in June, and at the Leicester Sky Ride in August.

We can also be found at the Hinckley Health Fair in August and at the University Hospitals of Leicester Public Meeting Health Fair in September.

Early in the year, in recognition of the UK Clinical Research Facility Open Day, 50 members of the public attended a morning of talks and a Research Fair. The event was opened by then Trust Chief Executive, Dr Malcolm Lowe Lauri and included a talk by Dr Will Nicolson on his award winning work. Colleagues from Cardiopulmonary Rehabilitation spoke about developing involvement with patients and the public and how they worked with patients to develop an online resource for rehabilitation. Dr Graham Warwick and Dr James Burton from Renal Care talked about research into kidney health and disease.

After these fascinating presentations, visitors had an opportunity to get up close to the research projects at the Research Fair, where researchers were on hand to discuss their current projects, and demonstrate some of the equipment they use.

Throughout the year, the ‘PPI Committee’ has also met monthly. This is a group of volunteers who represent patients and the public. Researchers work with this group to find out if their research meets the needs of patients and if their plans and materials are acceptable. The Committee has reviewed 11 research projects looking at the mechanisms that cause heart diseases, genetics, new devices and processes for use in surgical procedures and new types of treatments.

Visitors and researchers mingle at the Research Unit Open Day

The Mayor finds out about the work of the Cardiovascular Biomedical Research Unit

Dr Caroline Banahan demonstrates use of ultrasound to monitor blood flow to the brain