UNIVERSITY OF CAMBRIDGE

NHS National Institute for Health Research

The Cambridge NIHR BioResource NEWSLETTER

Bringing together local people and leading research / Issue 9

BioResource

Welcome to the latest edition of the Cambridge NIHR BioResource newsletter where we hope you will enjoy reading about some of the research that has completed recently as well as some that is ongoing. There are details about the areas of research that the BioResource has contributed to, events that we have attended and a fun word search at the end. Please look out for the section which details our next Open Evening on the 16th July 2018, we'd loved to welcome you there. **With over 17,000 volunteers on the BioResource in Cambridge we would like to take this opportunity to thank you all for your continued support.**

Study Updates:

The BioResource would not succeed without the support of our volunteers. You, our volunteers, are an invaluable resource for the progress of medical research and we highly appreciate your time and commitment. Here is a summary from a recently completed study:

'The role of GPR65 in Multiple Sclerosis'. Led by Professor Stephen Sawcer.

Multiple sclerosis (MS) is a disease in which the immune system mistakenly attacks and damages the brain and spinal cord. The disease is chronic and generally results in significant disability for the majority of those affected. Through careful analysis we have identified over 200 genetic factors (changes in the DNA code) that influence the risk of developing MS. One of these factors (code named rs74796499) lies next to a gene called GPR65 which enables a cell to sense the amount of acid surrounding it. Normally the level of acid in the body is very tightly regulated, but in areas of inflammation the level tends to increase. Using blood samples from BioResource volunteers we found that the activity of white blood cells is reduced when the level of acid increases. We are now trying to find out how GPR65 is involved in this process and establish how rs74796499 affects the response.

Sign up to our Facebook page today...

The-NIHR-Cambridge-BioResource www.cambridgebioresource.org.uk

Our volunteers have supported over 100 medical health research studies, resulting in over 80 publications in scientific journals. Here are a few areas of research we have contributed to:

Area of Research	No. of studies
Autoimmune conditions	25
Cardiovascular conditions & Haematology Inc. cholesterol, stroke, and genetic factors influencing blood component levels, e.g. platelet levels and white blood cell ratios	19
Psychiatry & Neuroscience Inc. mental health conditions, neurodevelopment, neuroscience and tasks investigating information processing	18
Neurodegenerative conditions	14
Immunobiology Understanding infectious diseases and how immune cells work to signal disease	12
Inflammatory Bowel Conditions	9
Cancer	3
Research techniques Improving genetic analyses	2
Metabolic conditions	1

FUN FACT

The average weight of an African elephant is 6,000kg. The total weight of all the BioResource volunteers from Cambridge (for whom we have data for) would be the equivalent of over 169 African elephants (1,016,982kg).

The BioResource is always keen to attract new volunteers of ***all*** ages (16+) to join. The more volunteers involved then the easier it is to support medical research.

So, if you know someone that would like to help in our quest to discover and treat different diseases, then please pass on our details below for further information:

email: cbr@bioresource.nihr.ac.uk

or call: 0800 090 1212.

FUN FACT

The total height of all the BioResource volunteers from Cambridge (for whom we have data for) is a staggering 23,120 metres. Mount Everest is 8,848 metres.

Studies: How did volunteers take part?

Volunteer Commitment	# of studies
One visit To give a sample of blood or medical scan. (75% of studies offered volunteers a home/workplace visit to participate)	54
One visit or multiple visits... to give several samples or measurements e.g. blood sample and b/p measurement, blood and fMRI, overnight stay.	27
No further demands Studies supported by data from the initial DNA sample, and Health & Lifestyle questionnaire or demographic information.	17
Online participation Completing surveys and/or computer tasks from home.	5

Study Updates: continued.....

To continue from page 1 please see another update of one of the studies that has been completed thanks to the help of BioResource volunteers:

The role of inflammation in the dementia of Parkinson's disease

Led by Dr Caroline Williams-Gray *(pictured)*

Parkinson's disease is typically characterised by movement problems, but dementia also develops in up to half of patients within 10 years of diagnosis, and has a major impact on quality of life and care needs. It is unclear what drives the rapid progression to dementia in some patients, but we think that a patient's immune response, not only to infections but also to the disease itself, might play an important role in this. In order to study this, we have been measuring markers of immune activation in the blood of 40 patients with Parkinson's and looking at how these immune markers are linked to the disease and to risk of developing dementia. It is important that we compare marker levels in people with Parkinson's and individuals without the disease, and so with the help of the BioResource, we have also been able to study blood samples from 40 healthy volunteers who are closely matched to our patients in age, gender and key genetic factors. So far we have found changes in a number of immune cell types (monocytes, B cells and T cells) in patients with Parkinson's compared to healthy volunteers, and some of these changes are linked to a higher dementia risk. We have also found that immune cells from people with Parkinson's respond more actively than cells from non-Parkinson's patients when they are stimulated in a culture dish. We are now continuing to explore immune factors in a larger study involving brain imaging, and hope that this work will ultimately help us to develop immune-based treatments to slow the progression of Parkinson's disease.

New research study

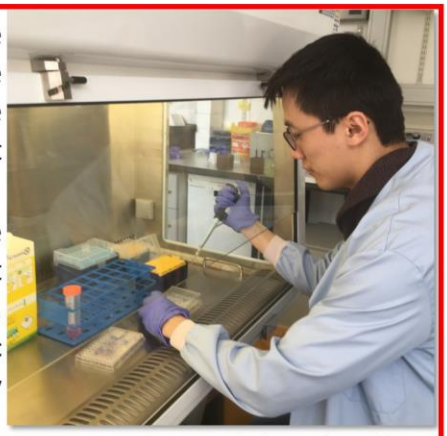
We have provided you with some updates of research that has completed and now below is a new study that the BioResource is contributing to and we hope that some of you will participate in, should you receive an invitation and meet the criteria.

Understanding the role of the CD86 gene in Multiple Sclerosis (MS)

Professor Stephen Sawcer said that by studying the genetic code (DNA) in thousands of Multiple Sclerosis (MS) patients and thousands of healthy controls we have identified over 200 genetic factors that increase the risk of developing MS. Each of these factors (changes in the DNA code) provides clues about why some people develop MS and others do not. One of these factors, code named rs9282641, lies next to a gene called "CD86". This gene makes a protein that sits on the surface of white blood cells and sends a signals to activate the immune system. By using sample donated by BioResource volunteers we have been able to show that the genetic variant rs9282641 increases the amount of CD86 in a particular type of white blood cell called a B cell (project 148). As a follow on to this study (project 167), we are aiming to find out what effect increasing the amount of CD86 present in B cells has on the immune system. We know that signals from B cells can result in the increased level ……*(continued on page 5)*

(continued from page 4).....and differentiation of other white blood cells called T cells. We also know that T cells can cause damage to the brain and spinal cord in MS. We therefore suspect that the increase in CD86 caused by the genetic variant rs9282641 will result in increased T cell activity.

To investigate this, we are inviting volunteers from the BioResource to provide blood samples so that we can see what effect increased CD86 in B cells has on the activation of T cells. Participants in this study are chosen on the basis of their genetic makeup (which was established from the blood sample they provided when they first joined up).



Pictured: Di He, a third year PhD student in neurology, who has been focusing on this study for the past two years processing some of the blood samples kindly donated by Cambridge BioResource volunteers.

This study will be continuing over the coming months. If you receive an invitation letter and decide to take part you will be asked to sign a consent form and to donate a blood sample for research tests. These samples will be taken by experienced research nurses in our clinical research facility at Addenbrooke's Hospital.

Please note: Not everyone will receive an invitation to this study — invitations are sent to volunteers who have the genetic variations the researchers need for their study. If you receive an invitation, please reply to let us know if you are interested in taking part or not. Volunteers are not selected because they are at any special risk of developing MS.

The NIHR BioResource out and about

The BioResource took part in the Cambridge Science Festival, at the **Cambridge Academy for Science and Technology (CAST),** on Sunday 25th March. It was a beautiful Spring day with the sun shining. Lots of visitors came by the **Health Research Unit** (pictured below) to have their height, weight and body fat percentage measured. We also met people on our stand within **CAST** on the day and were able to inform them about the objectives of the BioResource. This was a real family affair and it was great to see so many children engaging with the activities and developing their interests in science. We were also fortunate enough to have some new volunteers join the NIHR BioResource.

Open Evening Invitation

Our next volunteer Open Evening will take place on the evening of the **16th July 2018**, at the **Cancer Research UK Cambridge Institute, Li Ka Shing Centre**.

The format of the evening involves presentations from researchers that have or planning to use the BioResource to aid their research. There will be posters around the reception area and light refreshments available before and after the presentations.

Ticket bookings will be open ***from*** 12 noon on Friday 22nd June ***until*** 12 noon on Wednesday 11th July (or sooner if demand is high) via:

https://cbropeneveningjuly2018.eventbrite.co.uk. Tickets will be limited to two per person and we ask that no young children attend.

Please note that tickets will not be available before 12 noon on Friday 22nd June. However, we recommend that you book your tickets as early as possible. If there are tickets still available on Friday 6th July we will advertise the event to the public to ensure attendance at the event is as high as possible.

FUN FACT

For the volunteers that we have the data for, 88.1% reported being right handed, 11.7% were left handed and 0.2% were ambidextrous.

Change of contact details???

Please don't forget to keep the BioResource updated with you latest contact details. This will enable us to invite you to studies that you may be eligible for, but to also keep you updated with the BioResource progress.

You can do this by email (cbr@bioresource.nihr.ac.uk) or by phone on,

Freephone **0800 090 12 12**.

Thank you for your continued support with the BioResource. The research being achieved would not be possible without you.

BioResource Word Search

As a bit of fun, below is a word search along with their definitions. Some of these words have appeared throughout the newsletter, but we have also added some additional words that you might come across.

q	w	x	g	x	z	f	e	l	s	q	o	i	c	j
e	h	x	r	e	p	i	c	x	e	r	m	q	i	h
e	l	r	e	o	n	h	y	h	q	m	i	s	l	g
c	w	e	w	m	r	o	e	t	u	d	n	a	o	d
m	s	e	l	o	o	k	m	n	e	i	m	p	b	y
m	c	n	n	l	w	s	o	i	n	x	l	z	a	c
v	e	i	p	q	a	b	o	s	c	w	s	e	t	d
z	c	i	x	z	i	k	e	m	e	s	n	p	e	e
z	n	r	e	o	b	t	y	p	o	e	a	i	m	m
i	j	i	l	t	y	d	s	c	g	r	g	l	w	o
q	s	o	y	c	b	j	s	k	d	x	h	h	p	n
i	g	j	o	g	e	n	e	t	i	c	s	c	w	e
y	r	n	b	d	t	a	e	s	a	e	s	i	d	g
c	o	s	d	e	n	u	m	m	i	o	t	u	a	b
m	u	p	b	y	q	y	q	n	c	c	j	s	m	g

☐ **Allele** - a gene that is found in one of two or more different forms in the same position in a chromosome, and so produces a particular characteristic that can be different for different people, such as eye colour.

☐ **Autoimmune**: The immune system defends the body against infections and certain other diseases. Made up of different organs, cells, and proteins known as antibodies, it identifies, attacks, and destroys germs and other foreign substances. Sometimes the immune system makes a mistake and attacks the body's own tissues or organs. An example of an autoimmune disease is type 1 diabetes, in which the immune system destroys the cells in the pancreas that produce insulin.

☐ **Chromosome**: a structure made of tightly packed DNA.

☐ **Chronic**: with regards to illness or diseases, 'Chronic' means that it persists or occurs again and again for a long time.

☐ **Disease**: something that has specific symptoms that makes us poorly. All humans and animals experience diseases. For example, chicken pox is a disease and the symptoms include itchy spots!

☐ **DNA**: DeoxyriboNucleic Acid. A long molecule present in almost all cells in the body. It is your own personal set of instructions and makes you – you!

☐ **Gene**: a piece if DNA that has a function, for example eye colour is determined by your genes.

☐ **Genetics**: the study of our genes.

☐ **Genome**: a genome is your complete set of DNA, including all of your genes.

☐ **Genomics**: the study of genomes including their structure and function.

☐ **Immunobiology**: a branch of medical research that studies the body's immune system.

☐ **Metabolic**: in relation to metabolic conditions, "Metabolic" is any diseases or disorders that disrupts normal metabolism; the process of converting food to energy on a cellular level.

☐ **Monocytes**: these are a type of white blood cell that fights off bacteria, viruses and fungi. When certain germs enter the body, they quickly rush to the site for attack.

☐ **Sequence**: in the context of this word search, 'sequence' here refers to all of the letters that make up your DNA. For example, a piece of your DNA might have the sequence ATTGCC.

☐ **SNP**: Single Nucleotide Polymorphisms. Frequently called SNPs (pronounced "snips"), are the most common type of genetic variation among people. Each SNP represents a difference in a single DNA building block, called a nucleotide.