



Twenty-one years of discovery!

Winter 2013



Welcome to the 2013 TwinsUK newsletter

We are looking forward to celebrating the 21st anniversary of TwinsUK as we reflect on our achievements and look forward to future research success. A London-based twin party will give us the chance to celebrate with twin volunteers and raise our glasses to our successful gene discovery programme and healthy ageing research. Over the years, twins have collectively given thousands of hours of their time, donated countless samples and helped to achieve important advances in scientific knowledge. We are enormously grateful to all who have been involved and we hope that you are proud of your contribution. Please read on to find out more about the party, about our exciting new research results, the visit from our Patron Baroness Boothroyd, our fundraising Triathlon efforts and the new cutting-edge Flora study on how bacteria that live in our body are the window to our health.

Wishing you all the best for 2013 and I am looking forward to meeting many of you throughout this important year.

Tim Spector

Can you help with our fund-raising effort?

As a non-profit research group, dependant on grants and charitable donations (from charities such as the Wellcome trust and the Chronic Disease Research Foundation), we are looking at ways to increase funds for our research and engagement activities. Many companies support health care and health research in their programmes for charitable giving and Corporate Social Responsibility (CSR). We would welcome the opportunity to partner suitable companies in their CSR programmes, enabling them to fund specific areas of our ageing and health research programme. If you work for a company with a CSR programme or a budget for charitable donations, or are interested in making a donation to fund a specific area of research, please email our Research Grants and Finance Manager, Christel, at christel.m.barnetson@kcl.ac.uk

21st Anniversary Twin Party



Department of Twin Research & Genetic Epidemiology
Twenty-one years of discovery!

Please join us as we raise our glasses to YOU - our wonderful twin volunteers - at our 'coming of age' 21st Anniversary party on Saturday 8th June at St Thomas' Hospital, London from 10:30am - 4:30pm. Celebrations will include a buffet lunch, an anniversary toast and a whole host of activities such as research highlights, interactive research that you can take part in on the day, Q & A sessions, twin competitions and games, art display, performers, music, a merchandise stall, and a chance to hear some unique twin stories by the twins themselves. You will also be able to download from our web-site a commemorative anniversary photo as a keepsake. Tickets are £15 per head in order to help cover the costs of the food and drink. Places are limited, so please see your party invitation on the last page of this newsletter which will tell you how to book your place.

Look out for our 21st anniversary updates on our web-site www.twinsuk.ac.uk

Refer a twin and enter a prize draw for an ipad mini!



In honour of our 21st Anniversary, and to show our appreciation, we are giving you the chance to win an ipad mini. All you have to do is to ask your twin friends/family (who are age 16 and above, and living in the UK) to join our registry by calling 0207 188 5555. Once they have joined the registry and completed a visit or a questionnaire, your name and the twin's names will enter the prize draw for an ipad mini. We will have three prize draws in total - one in the spring, the summer and the autumn of this year. In particular, new London twins will get the chance to join our fascinating new twin study to find out how London-living affects our genes. Twins of all ethnicities

are welcome, and particularly those of African, Afro-Caribbean and Asian ancestry as these groups are currently under-represented in research.

To find out more, please ask your twin friends to look on our web-site at: <http://www.twinsuk.ac.uk/twin-zone/information-for-twin-volunteers>



DTR Fundraising

On Saturday 22nd September 2012 members of the DTR entered this year's London Triathlon to raise funds for the Chronic Disease Research Foundation, a charity that supports some of the research carried out at the DTR. Team TwinsUK took part in the 'Olympic Torch Relay event' in which Tim Spector (who cycled 40km), Debbie Hart (who ran 10Km) and Irina Gillham-Naseny (who swam 1.5Km) finished in an impressive time of 2hrs 56mins 01secs. Many thanks to all of you who helped raise £1860 for research.



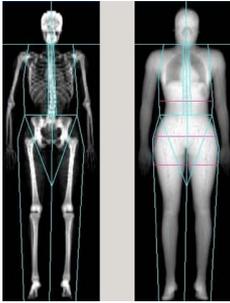
Irina, Tim and Debbie celebrate their success



DTR Research Results

NEW Healthy Ageing Twin Study (HATS) results

As many of you will remember, the HATS study which examined female twins over a ten year period, has given us the unique opportunity to examine the



genetic and lifestyle factors that influence changes in ageing over time. For example we recently investigated how the genetic contributions (or heritability) to bone density can change over time in our twin volunteers. We found that while our bone density is highly influenced by the genes we inherit, our age-related bone loss is not as influenced by our genes, and a healthy diet may help to reduce the rate of bone loss (see our HATS health tips on the next page).

New DTR study shows that FTO is not just a FAT gene

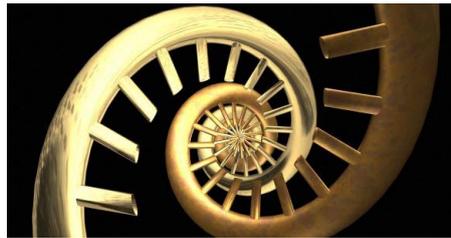
Many genetic studies, including our own, have identified a gene called FTO which is associated with obesity. However, some researchers suggested that this gene only influences weight in young people and it was not clear whether FTO influences only fat tissue, or other tissues in the body as well. We looked at FTO genetic variants in over 4,700 of our twin volunteers and



related them to measures of adipose and non-fat (lean) body mass obtained from whole body DXA scans completed at twin visits. We confirmed that not only is the

FTO gene involved in regulation of weight in our sample of older women, but also that it influences both adipose and lean body mass, showing for the first time that this important gene is not just a "fat" gene, but may have far reaching consequences on our body mass and type.

New back pain gene identified



©Oliver Burston, Wellcome Images

Researchers at the DTR have, for the first time, identified a new gene linked to age-related degeneration of the intervertebral discs in the spine, a common and highly heritable cause of lower back pain. Back pain costs the UK an estimated £7billion a year due to sickness leave and treatment costs, but until now the genetic factors associated with disc degeneration were uncertain. However DTR researchers, funded by the Wellcome Trust and Arthritis Research UK, compared MRI images of the spine in 4,600 individuals from TwinsUK, Europe and the USA with genomic data. They identified that the gene PARK2 was implicated in people with degenerate discs and could affect the speed at which they deteriorate. Dr Frances Williams who led this research said 'Further work to define the role of this gene will, we hope, shed light on one of most important causes of lower back pain. It is feasible that if we can build on this finding and improve our knowledge of the condition, we may one day be able to develop new, more effective treatments for back pain caused by this common condition.' This was reported widely in the media with a large feature in the Daily Telegraph.

Hot off the Press - EpiTwin results

Epigenetics is the study of heritable changes in gene expression that are not actually encoded in



our DNA. This means that although we are born with a specific set of instructions embedded within our DNA, changes to our DNA can occur during our life-time, which can change how our DNA behaves or is "expressed". Epigenetic studies at the DTR have now shown that these changes can affect our health and how we age, and also determine whether we develop certain diseases or not. For example we have identified a number of 'ageing' genes (including genes related to cholesterol and lung function) that are switched on and off by an epigenetic process. Professor Tim Spector summarises: 'This study is the first glimpse of the potential that large twin studies have to find the key genes involved in ageing, to find out how these genes can be modified by lifestyle and to start to develop anti-ageing therapies.'

Our 'EpiTwin' project has also recently published a study that looked at identical twins who were discordant for breast cancer (i.e. where one of the twins had breast cancer and the co-twin did not have breast cancer). The study showed that there were a number of DNA regions that showed epigenetic changes, especially a gene called DOK7. DOK7 changes were present nearly 5 years before breast cancer diagnosis which suggests that DOK7 epigenetic changes have the potential to act as an early indicator for breast cancer and may shed new light onto the changes that cause normal breast cells to become cancerous ones.

Epigenetics funding award for a new generation of scientists

Reaffirming our position as a world-leader in the study of epigenetics, we have been awarded prestigious EU funding under the Marie Curie Initial Training Network (ITN). From March 2013, the 'EpiTrain' programme will fund two PhD places and one postdoctoral place at the DTR to train the next generation of young scientists in the field of epigenetics. The students will learn how to integrate epidemiological, genetic and molecular techniques while studying how our genes and the environment interact on a molecular level across a range of common diseases.



Baroness Boothroyd, Patron of TwinsUK, visits the Department

In October we were delighted to welcome the new patron of TwinsUK, Baroness Betty Boothroyd, on a visit to the DTR. Baroness Boothroyd, a British politician who served as Member of Parliament from 1992 to 2000, was the first, and to date only, female Speaker of the House of Commons. In 1995 she was appointed the Order of Merit, an honour that is a personal gift from the Queen.



Professor Spector first had the pleasure of meeting the Baroness when they featured together on BBC Radio 4's 'Today Programme' in December of last year. Baroness Boothroyd had been invited as a guest editor and had chosen to investigate why she continues to be "in fine fettle" in her 80's. In order to get some answers she met with Professor Spector to discuss the genetics of ageing and underwent a 'twin visit' at the Department where she had a number of routine tests. Impressed by our successful research into ageing she agreed, much to our delight, to become a patron of TwinsUK, our twin registry.

On her visit to the Department she met DTR staff, discussing their work and future plans. We look forward to many years of her patronage and to celebrating our 21st anniversary with her.

Top HATS Health tips

As you may have read from our HATS results on the previous page, a healthy life-style can reduce the risk of age-related bone loss. Top tips from our docs on how to keep our bones as healthy and strong as possible include...

- Regular weight-bearing exercise such as brisk walking or running, keep-fit classes and tennis
- Time outdoors – sunlight is great for your bones (but don't get sunburned!)
- Wear supportive footwear such as trainers
- Eat/drink plenty of calcium, for example from milk, cheese, yoghurt, tofu and supplements if needed. A diet rich in oily fish, broccoli and spinach is high in essential vitamin D
- Quit smoking and limit alcohol intake
- Prevent falls by getting your eyes checked, improving your balance, and keeping muscles strong (try Pilates or Tai Chi)

Media Appearances

Did you catch us on television, the radio or in the papers this year? Due to the newly recognised importance of epigenetics in health and ageing, we have become the first port of call for many journalists wishing to cover this fascinating field. In addition, Professor Spector's book *'Identically Different: Why you can change your genes'* was voted one of the top 100 summer reads by the Sunday Times Culture Magazine. Professor Spector was also interviewed by BBC2 Newsnight about the doping row surrounding Olympic athlete Ye Shiwen at London 2012, and discussed the potential for epigenetic processes to be manipulated advantageously to enhance performance.

Professor Tim Spector also featured on BBC Radio 4 together with our twin volunteers, Dan and Scott Shillum who are 'identical twins' but who many people assume are non-identical (although they looked identical growing up). "We used to think the most interesting thing about identical twins was their similarities" Professor Spector explains, "but it's the differences, that tell you more." It's precisely because identical twins like the Shillum's have the same genetic code - and shared a very similar environment as they grew up - but have developed so differently as adults, that makes them an ideal case study. The comparison of patterns of epigenetic switching between them - and 5,000 other discordant identical twins enrolled in the EpiTwin project, will help us to identify the subtle differences that give rise to disease.



"We used to think the most interesting thing about identical twins was their similarities ... but it's the differences, that tell you more."

Professor Tim Spector



Look out on facebook and YouTube and www.twinsuk.ac.uk for our future media appearances, especially on BBC Horizon, BBC Radio 4, and even potentially in an article on Nutrigenomics in Good Housekeeping!

The BBC Horizon programme 'The Truth About Fat' also featured our Department and a number of our twin volunteers. On YouTube you can find 'Behind the scenes' footage of the filming as well as a range of videos that include research talks, interviews and many other DTR media appearances. Click 'Subscribe' and you'll be notified of any new YouTube video releases

www.youtube.com/user/DeptTwinResearch

Find us on facebook and, together with our 900 followers, you'll be the first to hear about our twin party, breaking research news and studies, media appearances and opportunities, and twin related news. Click 'Like Us' to follow us on ...

www.facebook.com/twinsuk





New DTR studies

Spotlight on The Twin Flora Study

Recently, studies have shown that the bacteria that live naturally in the gut play an important role in human health and disease. Each individual's bacteria are unique to them and small changes in this finely balanced community can cause illnesses such as Irritable Bowel Syndrome and perhaps even cancer, heart disease and obesity. The aim of this ground-breaking study is to discover how all these bacteria influence our health and to answer questions such as "What is the relative importance of genes versus our life-style (i.e. diet, smoking and drinking) on the types of bacteria that live in our guts?", "How much does our choice of lifestyle influence our bacterial diversity?" and "Can we alter our gut bacteria to make us healthier?"

What have 'gut bacterial' studies discovered so far?

Studies have shown that we each possess a unique community of bacteria living in and on our bodies from shortly after birth.



This community appears to change through life stages. A recent study showed that older people with less diverse bacteria have more health problems and increased frailty. Other studies show that the foods we eat may influence which types of bacteria thrive in our gut, and have also discovered that certain types of gut bacteria are associated with obesity, blood pressure, gut diseases and allergies. Scientists have also found out that the bacteria that cause gum disease may enter our bodies and play a role in the development of atherosclerosis - 'furring' of the arteries that causes heart disease.



How might this study help people in the future?

Learning more about the bacteria that live in our bodies and their effects upon our health may help scientists to develop new methods to diagnose diseases. It is hoped that this information may help us to develop better treatments for some diseases and give better dietary advice.

Are there any advantages to being in the study?

The main benefit is the opportunity to take part in a crucial landmark study that may change future health care for everyone, and we will keep you up to date with our research results and advances in this field. The research team hopes to be able to report back a brief summary of your gut community composition!

As a twin, why is this study important?

We will be able to use the wealth of information that we have already collected on many of you over the years to help piece the puzzle together as to how our bacteria influence our health. If most of you provide samples – with over 8000 twins currently

participating in our studies – we will have large enough numbers to conduct a huge study to show the link between gut bacteria and health. Since our bacteria appear to change throughout our life, repeat samples would be a source of very useful information (please also note that every-one can contribute to this research, single and paired twins).

What do I need to do to be in the study?

The only way to investigate bacteria in the gut is to analyse a stool sample, extract the DNA and record the bacteria's DNA profile. Participants can either receive a stool sample kit in the post which includes gloves and a hygienic donation kit with instructions (plus a pre-paid postal box to return the sample in), or can arrange to donate a stool sample at a visit to the Department at St Thomas' Hospital. Volunteers will also be asked to fill in a consent form and complete a diet questionnaire. We will be in touch with you in the next year to ask you to participate.

Testimonial

Molly (age 60) from Devon wrote to us about her participation in this study. *"The instructions were clearly laid out. Very little could actually go wrong if you followed them. All the equipment that was needed was supplied to make it an easy and hygienic process; therefore it was nothing to be scared of. As it's for a very good cause, and could change the way we think about our health, I would encourage all to participate and I wouldn't hesitate to take part again..."*

A BIG THANK YOU IF YOU HAVE ALREADY PARTICIPATED – WE ARE VERY ENCOURAGED BY YOUR POSITIVE FEED-BACK

Chronic Widespread Pain (Fibromyalgia) Study for Non-Twins

Having studied fibromyalgia in twins we are now starting a big recruitment drive for non-twins with chronic widespread pain (fibromyalgia). If you have any friends or family with this condition who are willing to complete a short questionnaire and donate blood via their GP, please ask them to email twinsuk@kcl.ac.uk or call 0207 188 1928

Brain Donation Research

Many thanks to all of you who have shown interest in the twin brain donor research programme. Donations from members of TwinsUK registry who have had detailed research measurements are particularly valuable. For more information please contact the Brain Bank team on 020 7848 0290 or go to: www.kcl.ac.uk/iop/depts/cn/research/mrclondonbrainbank.aspx



CHANGE OF DETAILS? To update your details, please email us at: twinsuk@kcl.ac.uk or call us on 0207 188 5555

Department of Twin Research, St Thomas' Hospital, Westminster Bridge Road, London SE1 7EH
Tel: 0207 188 5555 Fax: 0207 188 6761 Email: twinsuk@kcl.ac.uk Web: www.twinsuk.ac.uk



Invitation



Department of Twin Research
& Genetic Epidemiology
Twenty-one years of discovery!

21st Anniversary Twin Party

Saturday 8th June 2013.

At St Thomas' Hospital, London. 10:30am to 4:30pm

*Please join us as we raise our glasses to YOU
– our wonderful twin volunteers –
at our 'coming of age' 21st Anniversary Party*

Celebrations will include

- a buffet lunch
 - an anniversary toast
 - research highlights
 - interactive 'live' research
 - Q&A sessions
 - twin competitions
 - art display
 - performers
 - twin guest speakers
- and more!!!*

PLEASE REGISTER

(places are limited) by paying online at www.kcl.ac.uk/twins21

- Create your own ACCOUNT with a personal password.
- Then BOOK ticket(s) using the following party password.

DTRparty2013

You will also need your **STUDY NUMBER**
(from the email you received that included this newsletter link).

Tickets are £15 per head to help cover the costs.

Please call 0207 188 5555 if you need your study number.