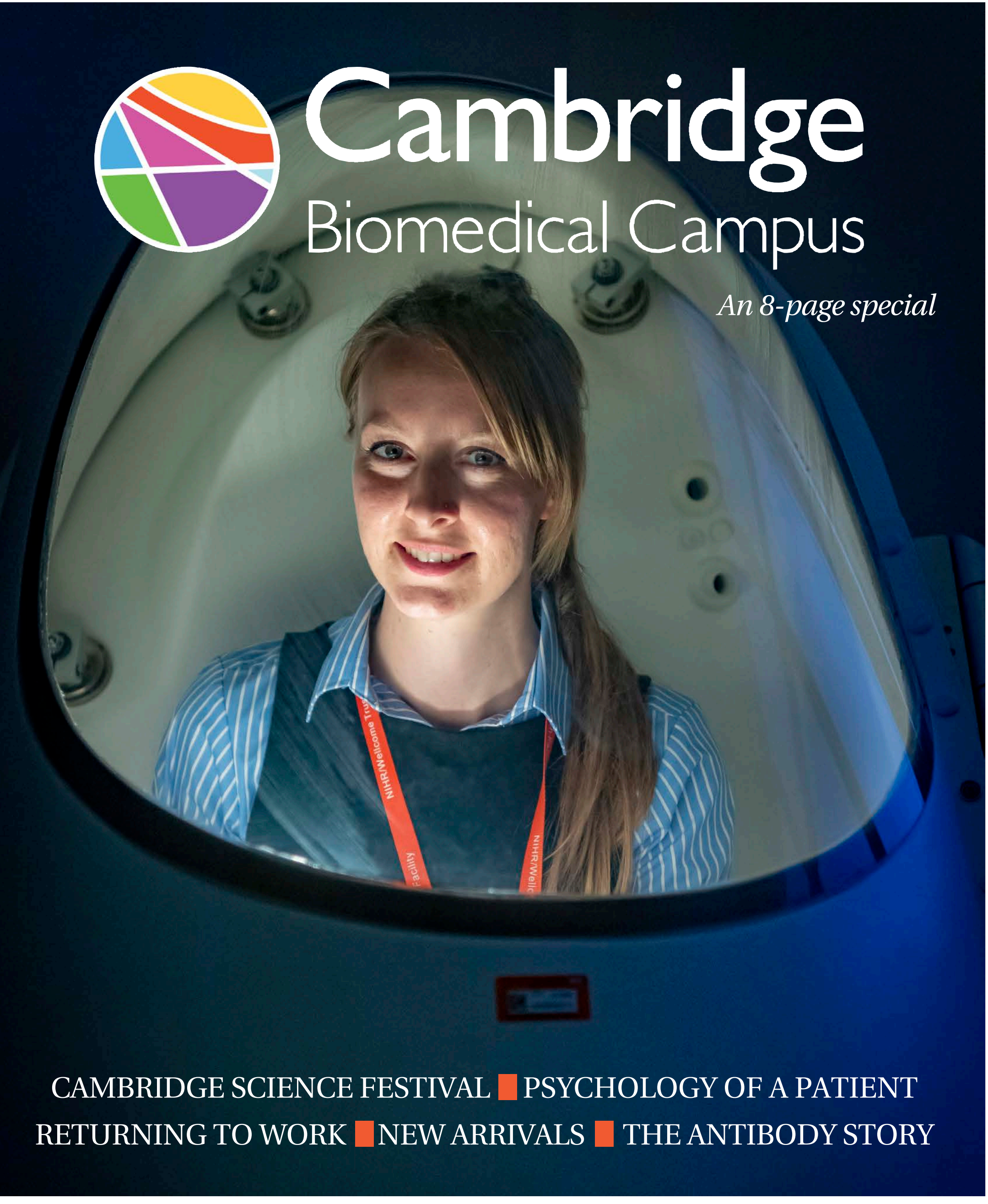
Cambridge Biomedical Campus

An 8-page special



CAMBRIDGE SCIENCE FESTIVAL ■ PSYCHOLOGY OF A PATIENT RETURNING TO WORK ■ NEW ARRIVALS ■ THE ANTIBODY STORY

Moving to the campus

By the end of the spring, three new buildings will have opened on the campus: Abcam, the Jeffrey Cheah Biomedical Centre and Royal Papworth Hospital. **Tony Taylorson** talks to three people moving to the site about their moves, the challenges they have faced and what they are looking forward to.

Srinjan Basu, from the Wellcome-MRC Cambridge Stem Cell Institute and Darren Graver from Abcam in the new Abcam offices
Picture: RIchard Marsham

Cheryl Riotto

Cheryl Riotto is head of nursing for CADS and ambulatory care at Royal Papworth Hospital – she has a busy and crucial role looking after the hospital's critical care unit, day wards and outpatients service among many other things.

"At the moment my job takes me to buildings across the whole of the hospital estate. By the end of the day, I can have done over 25,000 steps from one end of hospital to the other and back again numerous times in all sorts of weather.

"Thankfully in the new building all the areas I look after are pretty much on one floor – not good for my steps but excellent for giving patients the best possible care. For example being able to move a patient from one ward to another without going outside seems such a small thing but it will make a huge difference to how someone feels.

"The new hospital is designed to inspire close interaction between teams. At the moment, people who work hand in glove on similar parts of a patient's journey may not often see each other but this will all change come May.

"This is why we are all looking forward to moving to the new building – there's sort of a nervous anticipation like you get on Christmas Eve or before your wedding. It will be exciting to see how our patients react to having their own rooms and all the improvements which will come with this such as infection control and dignity.

"Our move is all about providing better healthcare for our patients but also looking to develop the next generation of treatments. This is why for me being on the campus will be so great. Being next to so many world-class partners will create opportunities to do amazing research. If you group like-minded people together there will be benefits.

"It is not just about equipment or having an efficient building, it is about bringing the Papworth culture with us. For me, what makes out hospital outstanding will always be with us – patients are at the heart of all we do. With that attitude we can never fail."

Darren Graver is the project manager for Abcam's move to its new building in Discovery Drive.

He is leading the team which has overseen moving the company from three separate buildings on the Cambridge Science Park to their new global headquarters on the Biomedical Campus.

"I have been responsible for looking after the fit out and relocation of our offices. With such a unique mix of spaces and teams, including laboratories, logistics and corporate functions, it's been an exciting challenge to be a lead on this project. It helps to have a great project team to support me.

"To support with the transition, we provided mock-up areas in the office, where employees could test furniture and try out new technology. We also have internal champions 'Move Makers' to support colleagues with moving, and our new flexible ways of working at Discovery Drive.

"Moving from three buildings into one offers the opportunity for far greater collaboration between teams. The new building has different types of meeting space, a cafeteria, and employees will hot desk within neighbourhoods. This is all designed to foster innovation, creativity and support agile working."

"Joining a world-class life science community on the campus means we can be at the heart of science and brings us closer to our customers to help accelerate scientific discovery. It is a really exciting next step in the journey of Abcam, and I am proud to have been part of this."

The new Abcam headquarters

Srinjan Basu is a group leader at the Wellcome-MRC Cambridge Stem Cell Institute.

His work is involved in what is called 'fundamental research' – looking at key questions such as what defines a stem cell and understanding how these cells change during development. His team will be moving into the newly built Jeffrey Cheah Biomedical Centre in April this year.

"I joined the Cambridge Stem Cell Institute in December 2018 ahead of the move to the new building. I'm currently working in temporary lab space at the Institute site on Tennis Court Road so I'm definitely looking forward to moving in to our new home on the campus.

"My role involves lots of fundamental research, and if you want to understand how stem cells work, there is probably no better place than Cambridge, and especially on the new site which contains everything from lab-based science through to cutting-edge therapies for patients on site. My lab will be closer to clinicians and researchers at the MRC LMB, GSK and AstraZeneca. This means we can work with patients closer to where their care takes place and develop more meaningful collaborations.

"This may seem obvious but it can be tricky to effectively work together if you are in different places. The beauty of the new Jeffrey Cheah Biomedical Centre is that the entire Institute will be in one place which obviously helps bring people together.

"Being in the same building with many other researchers interested in different types of stem cell research will really allow collaborations to develop.

"This will be helped also by the Milner Institute and the Cambridge Institute of Therapeutic Immunology and Infectious Disease, who are sharing the building with us.

"It will be interesting to see how the research cultures of the three Institutes will evolve – how the exposure to other teams and their ways of working will encourage me and my team to think more about how our research links to the other areas. It will give a bigger picture view, which is what I think the campus should be all about."

The doctor

"No two patients are the same and I need to tailor information to the individual as best I can. I try to pick up signals as I watch someone walk through the door – do they look well? Do they look like they are struggling? Are they young or old? When they come with family, what are the family dynamics? All of these signs will influence what I am about to say next."

Dr Pippa Corrie is a consultant and associate lecturer in medical oncology at Cambridge University Hospitals. She has been a consultant for over 20 years and became interested in working with cancer patients as a trainee doctor.

"I was always interested in working with people and how scientific discoveries can help improve patient outcomes. Cancer research is a huge evolving field of medicine – as we get a better understanding of cancer, so we are developing better, more specifically targeted drugs that are more effective in treating a very difficult set of complex diseases.

"Communication is especially important as in my role, I see people who have already been told they have cancer, but don't yet know the specifics and their prognosis. So I begin by asking questions about their background to get a feel for them and judge how they may react to what I am about to explain.

"It is key that in what I say I am able to, as gently as possible, help people come to terms with their diagnosis.

"The majority of people I see won't have curable cancer, so I need to provide the facts and options as clearly as possible, but I also understand this news will be quite shocking and not all people want to have it spelled out.

"So I try to break it down in pieces and gauge their reaction, before continuing. People can take bad news in many different ways – some break down, some put on a brave face, some are resigned, already expecting bad news – each reaction is completely natural and understandable, particularly when mortality is a subject that people rarely talk about in our modern secular society.

"After breaking bad news, I make sure the patient and others who have accompanied them have plenty of time to ask any questions they have and I answer them as honestly as possible. Even when the news is bad, my goal is to ensure the patient doesn't leave without being given some element of hope, but that hope needs to be realistic, if we are to build a relationship based on trust both now and in the future. I will outline a treatment plan and the details, but I understand for many they will not be in a state to take too much else in. We give patients written information and we copy our clinic letters to the patient, so they can reflect on the conversation afterwards.

Dr Pippa Corrie Picture: Richard Marsham

"I would always encourage anyone coming to what might be a stressful hospital visit to bring someone with them – a family member or friend – someone they can trust and who can act as an extra ear, taking in information and providing support.

"Patients often put on a brave face in front of the doctor, and once they leave the consultation room, reality will kick in. We have specialist nurses in our clinics who are there to provide help and will follow up perhaps with a phone call afterwards, especially if someone came alone and didn't appear to have a strong support network in place.

"It's an overused word but people diagnosed with cancer are now on a journey – my meeting with them is just the start. There will be some very tough times ahead from feeling rough during treatment to feeling terrified around scan result times but I hope the support, understanding and trust which is built up over time with me and my team helps people feel they are not alone on that journey.

"Our goal is to be there for them as much as we can, every step of the way."

The psychology of the patient

Being diagnosed with cancer is life-changing, forever altering your concept of what your future holds. **Tony Taylorson** speaks to an oncologist and a patient to understand their experiences.

Liz O'Riordan

The patient

Liz O'Riordan was a slightly different cancer patient because she is a consultant breast surgeon who has treated hundreds of patients throughout her career

"In my job, I have walked through waiting rooms more times than I care to remember. I have seen anxious couples sitting trying to distract each other from what might be about to happen. Then they come in and I explain to them what is happening, letting them absorb what I am saying – but it's hard. I have so much information to give them and I now know they take very little in.

"As Pippa has explained people react in different ways. When I was diagnosed with stage 3 breast cancer my mind just went blank. People talk about an out of body experience but I genuinely felt I was hovering above the room – what I heard just couldn't be real. I wanted to run away, scream and shout at the unfairness of it all.

"I'm not sure I took anything else in but I know I felt incredibly lonely as I walked out of the consultation. I realised even if I thought I could take bad news I couldn't and that comes from someone who has been on the other side of the desk. But I soon realised I wanted to live and not just survive. I wanted to be a 40 year old woman – be able to work, go on holiday, have sex – do all the things which makes people live.

"For me the key was getting support from my family and friends, from social media and from the places like Maggie Centres. At Maggie's they get it and have your back so go there and have a cup of tea and let them help. I would also recommend what I call safe internet sites for when you need an answer at three in the morning.

"The other thing I did was exercise. I did what I thought was right for me – I ran to help forget about cancer. There is now mounting evidence to show that exercise should be the fourth cancer treatment. It can reduce the side effects of treatment and reduce the risk of recurrence. Everyone should be encouraged to do something they can enjoy.

"Having the unique experience of being on both sides of this conversation, I have thought long and hard about whether the diagnosis can be presented differently.

"Would it be better to do it over the phone and then allow patients to come in and see their consultant having properly prepared? Should we have patient portals? With 25 per cent of cancer being diagnosed in A&E, how can we better inform people?

"I do know that the NHS needs more money and clinicians need more time with their patients and if my experience has helped in any way it has been reinforcing the value of listening and the impact of words can have.

"Every patient is different and doctors need to respect that."

Useful websites Liz recommends:

- Macmillan: macmillan.org.uk
- Breast Cancer Care: breastcancercare.org.uk
- After Breast Cancer Diagnosis: abcdiagnosis.co.uk
- Ticking Off Breast Cancer: tickingoffbreastcancer.com
- Liz O'Riordan's website: liz.oriordan.co.uk

Katie Carr at the NIHR Clinical Research Facility

Pictures: Keith Heppell

A weighty problem

We all know that we should eat less if we want to lose weight, but why is it so difficult? **Craig Brierley** looks at how Cambridge researchers are trying to answer this surprisingly complex question.

Eva Li rolls up her sleeve to reveal a colourful plaster on her arm, illustrated with cartoon chickens.

The plaster covers the spot where she has just given a blood sample.

"You were very brave," says her dad, John, proudly.

"It's my birthday tomorrow," she says. She will be 10 years old. Eva points to her chest, where she has to wear a heart monitor for three days. "It's going to be funny because I'm going trampolining, so my heart's going to go up and down!"

It's mid-morning and Eva and her dad have just completed an overnight stay in the National Institute for Health Research (NIHR) Clinical Research Facility.

Fortunately, unlike almost everyone who spends the night in a bed at the hospital, there is nothing wrong with them.

Eva and her dad have been taking part in a study of healthy volunteers. The study is to collect data to help scientists and doctors understand how our bodies function – and in particular, how our metabolism works. Metabolism is your body's way of burning fuel.

When you have a meal, it gets broken down in your body and some of it gets converted into energy to keep you going throughout the day. If you eat too much, some of it will be stored as fat for you to burn later.

The healthy volunteers study is just one of several under way at the facility. Volunteers ranging from ages six to 65 spend the night in the facility, where the team measure everything from body fat and bone density to fitness and sleeping heart rate.

Volunteers stay in one of the state-of-the-art 'calorimeter rooms'. The rooms are airtight, allowing the team to accurately measure how much energy they burn by sampling the amount of oxygen and carbon dioxide in the room while the volunteers sleep, watch TV or exercise.

"From the moment they step in the door, everything is measured," says Katie Carr, a metabolic nutritionist who runs the studies.

It's very hands-on work for Katie and her team – they even have to cook meals for the volunteers.

"That way, we can control to the exact calorie how much they eat. For the children, we try and give them their favourite food, though we had one child in recently whose favourite food was sushi, which made it a bit difficult!"

With more than a quarter of adults in the UK and one in five children classed as obese, clearly something is going wrong. The problem is that many of us eat far more than we need to and don't exercise as much as we ought to, so we put on weight.

And as everyone knows, once we've put on a few pounds it can be very difficult to lose them again.

The solution to the obesity epidemic should be simple: eat less, lose weight. It turns out to be far more complicated than this.

You only need to look at the variety of research taking place on the Biomedical Campus alone to get an idea of quite how complex the problem is.

Next door to the NIHR facility sits the Wellcome-Medical Research Council Institute of Metabolic Sciences, part of the University of Cambridge, which is "dedicated to research, education, prevention and clinical care in the areas of obesity, diabetes and related diseases".

The institute has researchers looking at everything from the signals sent by the gut to the brain to tell us we're full to whether it is possible to change our 'bad' white fat into 'good' brown fat to how our mother's diet – or even our grandmother's diet – during pregnancy affects our weight.

Other researchers at the institute are trying to understand how the environment around us encourages us to eat more – and what we can do about it.

Does the size of your plate encourage you to eat more? Does the position of sweets in the supermarket mean you 'impulse buy' them when you're waiting at the checkout? If there are a lot of takeaway outlets near your home, are you more likely to eat poorly?

The answers to these questions may seem obvious, but if you want national or local government to take action – either to encourage or compel businesses to make a change – then you need to provide them with the evidence to back them up.

One of the researchers working at the institute is Dr Giles Yeo.

You may recognise Giles: he is one of the experts on BBC Two's *Trust Me, I'm a Doctor*. The programme has seen him look at the causes of heartburn, ask if 'man 'flu' really exists, and go vegan for a month. (Although he now eats meat again, he says the experience has had a dramatic effect on his behaviour – he's just as happy to go for a cheese and onion sandwich at lunchtime as he is a meaty sandwich, something he would never have considered a year ago.)

In his day job, Giles's research looks at "why we all behave differently around food". It involves looking at how cells in the brain respond to hormones circulating in the blood, particularly those such as insulin that are produced in response to the food we eat.

His work makes use of tissue from the Cambridge Brain Bank, to which thousands of people have donated their brains since it opened in 1975.

If his research, and that of his colleagues at the institute, has taught him one thing it is that we are not really in control of how much food we eat. It seems like everything conspires against us.

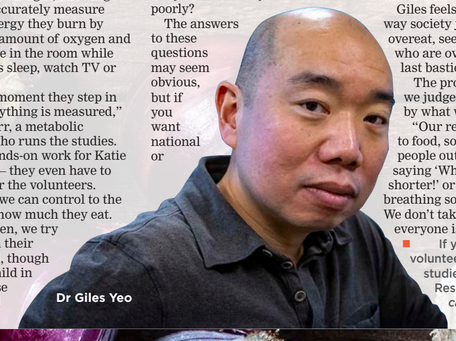
"While you can argue that obesity is a disease of 'choice', in the sense that we can always say no, some people will always find it difficult to say no because they are more driven to eat," he says.

Giles feels passionately about the way society judges those who overeat, seeing attacks on people who are overweight as one of the last bastions of prejudice.

The problem, he says, is that we judge everyone else's actions by what we know of ourselves.

"Our reaction is 'I can say no to food, so why can't you?' Calling people out is awful. It's like saying 'Why are you so tall? Be shorter!' or 'Why are you breathing so much? Breathe less!' We don't take into account that everyone is different."

■ If you are interested in volunteering to take part in studies at the NIHR Clinical Research Facility, visit *cambridge.crf.nihr.ac.uk*.



Dr Giles Yeo

> *"From the moment they step in the door, everything is measured"*
>
> Katie Carr
> NIHR Clinical Research Facility

Volunteers John and Eva with Katie Carr

Katie Carr in the Bod Pod

A fortnight of amazing science

With events from astronomy to zoology, Cambridge will be alive from March 11 to 24 with a fortnight of amazing science. Join us for fascinating talks and fun activities across the city.

The festival comes to the Cambridge Biomedical Campus on Sunday, March 24 and the site will be hosting activities at Cambridge Academy for Science and Technology, Cancer Research UK Cambridge Institute and at Biomakespace at the Clifford Allbut Building. Events run from 11am to 4pm and all are free to attend.

There will be lots of things to see and do for the young and old and everyone in between.

Discover how your body works, how cancer research is evolving and talk to the people whose research is saving lives every day.

Get hands-on with DNA and genetics, find out more about healthy diets and how blood donors save the lives of thousands of people every day.

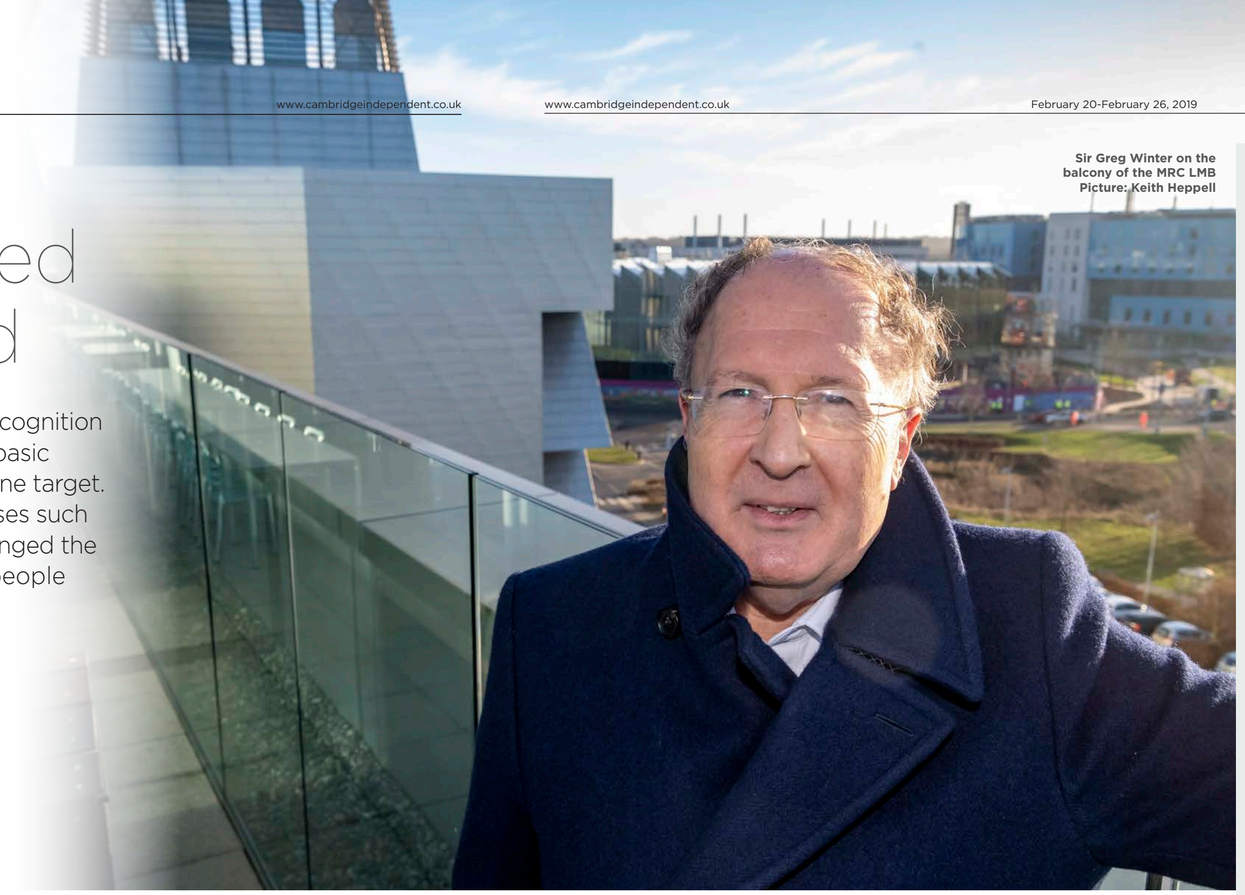
There'll even be the chance to find out how you can contribute to research on the campus too.

■ For more information about the Cambridge Science Festival, and events on the Biomedical Campus, visit *sciencefestival.cam.ac.uk*.

> *"Some people will always find it difficult to say no because they are more driven to eat"*
>
> Dr Giles Yeo
> University of Cambridge

Nobel Prize-winning work that has changed lives across the world

Greg Winter won the Nobel Prize for Chemistry last year in recognition of his work on antibodies. He realised they all have the same basic structure, with only small changes making them specific for one target. This discovery led to antibody therapies for cancer and diseases such as rheumatoid arthritis and multiple sclerosis, which have changed the lives of patients across the world. Here we hear from four people who worked with and benefitted from Greg's discoveries.



Sir Greg Winter on the balcony of the MRC LMB
Picture: Keith Heppell

"Greg had a vision to drive things forward – he encouraged people to think, take risks – there was a clamour to be part of his team."

Peter Jones had known Greg Winter throughout his academic career but a visit to a famous book shop proved to be the start of something special.

"It was summer of 1984 and I'd been living and working in Germany. I came back to visit friends and family and popped up to Cambridge to stock up on English books in Heffers.

"I called into the lab at the MRC Laboratory of Molecular Biology (MRC LMB) to catch up with Greg and I was fascinated to learn of his work.

"Soon after, he badly injured his arm in a road accident and he asked if I was interested in joining his small group at the MRC LMB working on something new. I was back then, literally, his right-arm man.

"Greg had realised that antibodies would play a pivotal role in medicine and had been developing new techniques to create them.

"Back in the early 1980s, the work in this area had focused on creating rodent-based antibodies which were proving extremely powerful diagnostic tools for both research and medicine but limited in use in humans by rejection as foreign proteins.

"Greg thought we could do better and that we should be able to create antibodies which were completely humanised. This is what science is about – gradually doing more and more to push the boundaries. Greg was creating a team to drive forward what was possible – how could I turn down such an opportunity?

"Over the months, we developed new techniques which were successful but cumbersome and time-consuming but gave rise to humanised and clinically relevant antibodies which would be of use to our friends and neighbours in Addenbrooke's.

"We felt there was a better way and so we looked at how the human body develops antibodies which, to cut a long story short, ultimately led to the discovery of the phage display.

"To put it simply, it provided a way to identify target-binding antibodies from libraries of billions of different human antibodies without the need to screen each molecule separately.

"The discovery meant we could speed up the process of developing and creating fully human antibodies capable of specifically targeting certain diseases.

"Greg has had vision to drive us forward – to be the bridge between technologies. He is fiercely intelligent, a fast learner and someone who inspired all of us to do more. He was a natural leader who respects your ability and encourages you do your thing. This is incredibly powerful.

"I came back from Germany to work with Greg because I trusted his judgment and that his ideas looked like – and have proved to be – the future.

"If he felt it was the right way to go then I believed him because he viewed things with such clarity and could see a way through. I am glad to have been proved right in so many ways and proud to have worked with Greg until I retired.

"His work not only changed careers, it has changed lives."

Greg Winter, back, and Peter Jones in the late 1990s
Picture: MRC LMB

The importance of antibodies

Why should Greg Winter's breakthroughs and the focus on antibodies be seen as such a success story?

The discovery of antibodies encouraged scientists to develop animal and human blood serums to treat viral and bacterial infections.

However, developing antibodies to treat cancer and autoimmune disease has major problems. Scientists have to identify and isolate the disease target – they can be a tiny part in a complex mixture of human proteins (think of it as a needle in a haystack) but they also needed to get the body's immune system to response positively and not reject the treatment.

By pioneering a technique to 'humanise' mouse monoclonal antibodies and then developing methods for making fully human antibodies, Greg found a way to develop treatments which were less likely to provoke an immune response in patients.

Today, monoclonal antibodies account for a third of all new treatments. These include products for breast cancer, leukaemia, asthma, arthritis, psoriasis and transplant rejection, and dozens more that are in late-stage clinical trials.

'It was like a magic wand ...it put my life back in the fast lane'

Theresa Langford worked at the MRC Laboratory of Molecular Biology (MRC LMB) for 29 years, working her way up to become the Head of Biological Services Group.

During her time, while aware of Greg Winter's work, she couldn't have foreseen the impact it would have on her life after she was diagnosed with Sjogren's Syndrome at 32.

"I have Sjogren's Syndrome which the experts think goes back to when I had a glandular fever-like virus when I was 25. Sjogren's is an autoimmune disorder where the body's immune system attacks glands that produce fluid, such as the tear and saliva glands. I kept going down with a succession of odd medical issues and felt utterly, utterly exhausted – all classic signs of the syndrome as basically my thyroid gland had packed up.

"The fatigue was more than just being very tired – it was life-drainingly exhausting.

"To do anything was bloody hard work – even getting up was incredibly demanding, and all together, it was depressing. But I had to get up to go to work to pay the mortgage – I am a tenacious person but all my available energy went into my job, I didn't have the energy for much of a social life. I had a simple choice: work or anything else.

"This went on year after year as I coped with all the ramifications of a succession of illness, until I was finally diagnosed when I was 32 by Ken Smith (who is now professor of medicine and head of the Department of Medicine at the University of Cambridge). He recognised what was happening to me. However, the seven non-biological treatments available at the time which I tried over a number of years were a mixture – some were OK to take but ineffective while others had awful side-effects and my white blood cell level crashed and/or I felt terrible.

"As well as the tiredness and my tear glands practically not working, I developed rheumatoid arthritis which for someone in their 30s was awful.

"I was always aware of Greg Winter's work from being in the same building as him and had avidly followed any papers which spoke of a breakthrough in this area.

"It was a fairly short succession from starting CAT that Humira was identified as a potential medicine, and I was accepted onto a clinical trial which involved a drug called etanercept – part of the family of drugs called 'the biologicals'. This was in February 2005.

Theresa Langford went back to sidecar racing Picture: Keith Heppell

"On clinical trials you don't get told what you are taking (it's called double-blinded) but the first morning I woke after starting my course I knew I was on the real stuff. It was like a magic wand – there was no other way of describing it. The swelling from the arthritis and the fatigue just melted away.

"My life began to get back to some sort of relative normality especially after several operations to block my tear ducts. I could ride motorbikes and horses again, go camping – I was keen to do everything as my world was opened back up. I could also go back to sidecar racing with my husband and I am still doing it, we recently competed in four European race meetings.

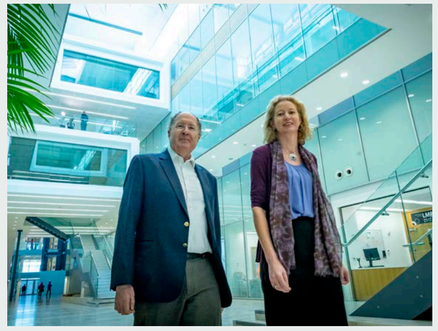
"I stopped taking etanercept in 2014 as after tests it seemed the rheumatoid arthritis had gone. We aren't quite sure why but I can only express my huge gratitude to Greg, the people who developed 'the biologicals' and the systems we have in place in the UK to allow for such research to take place, from the government grants to the animal research.

"I should also mention the various support groups too – especially the Cambridge branch of the British Sjogrens Syndrome Association, without them I would have been in a very different place.

"I sometimes wonder what would have happened if etnaercept hadn't been invented. I had worked my way through all the other treatments – there was nothing else left which was either effective or not toxic. I suppose I would have gone back to the least bad and just plodded on.

"I would have had a different career path or not been able to do all the things I wanted to and everything which went with it – and it would have been painful and bloody miserable.

"So I count myself as exceptionally lucky it worked."



Sir Greg Winter and Dr Jane Osbourn at the MRC LMB
Picture: Keith Heppell

'His challenging questions kept everyone on their toes'

Dr Jane Osbourn and Dr Tris Vaughan both worked with Dr Greg Winter at Cambridge Antibody Technology (CAT), now MedImmune (the global biologics R&D arm of AstraZeneca) in the early 1990s, soon after the company was founded. They now have global, senior roles within the organisation, but when they were working with Greg – more than 25 years ago – they were relatively junior scientists, and just beginning their careers in industry.

Tris recalls: "When CAT was small, there would be a science meeting every Friday morning where two researchers would talk about their work with their colleagues.

"This sort of discussion is always interesting and incredibly useful as a way of sharing ideas, but when Greg attended (which was most weeks), the meetings were raised to a higher level!

"Greg's challenging questions and scientific insights were terrifying to a young scientist, and his expectation that you had read the latest related scientific publications kept everyone on their toes (no such thing as the internet in those days).

"It was great training though, and an immensely valuable experience – and, even today, there is still a weekly science meeting every Friday morning at MedImmune's Granta Park facility. The cultural value of such an open forum for sharing progress with colleagues really can't be underestimated."

Greg's deep understanding of CAT's science meant that he was also invaluable strategically, working closely with the senior team. He had confidence and credibility, and also helped to embed a culture of collaboration into the company.

Jane remembers: "CAT's scientists were encouraged to spend time with Greg's team at the MRC Laboratory of Molecular Biology. There were differences of course, the LMB team were academic scientists while we were working within an industrial environment with a different focus. However, the exchange of scientific ideas and sharing of information were pivotal to many of the advances we made in our field of research and, building on the work Greg started at the LMB, we were able to create world-leading phage display libraries."

These libraries are still in use, and growing, today. CAT, with Greg's influence, was an 'early adopter' and led the way.

Jane comments: "The core platform technology which was developed and applied by CAT was ahead of others, but it was a competitive field. Greg helped us understand the importance of publishing scientific papers and of filing patent applications."

Tris adds: "As new recruits to the industry we didn't just learn how to undertake research from an industrial perspective; we also learnt about the non-scientific elements that characterise working for a small, start-up biotechnology company – from buying the milk to covering for colleagues when they were absent. Everything had to be done with real urgency."

Now, phage display technology is used around the world for antibody discovery and remains fundamental to the discovery of biologic medicines. There are more than 60 potential drugs derived using phage display in clinical research, and around a dozen already on the market, treating a wide range of diseases, including inflammatory and respiratory conditions, and a range of cancers.

Jane concludes: "When we worked with Greg and the wider team at CAT, we were working with the best.

"Looking back it's easy to reflect how fortunate we were to have Greg behind our scientific research: who knew then that we'd still be working with and evolving the phage technology so many years later."

Help with returning to work

Skilled workers will always be in demand, but if they have taken a career break how best can they be brought back into the workplace and what challenges do they face? **Kate Waters** has been speaking to three people who had very different journeys back to work.

"I'd been out of the nursing profession for 17 years since I left Papworth in 2000 because I had young children and because my husband's job meant he travelled a lot – it made things difficult when it came to childcare. Not long after that we moved to California for eight years."

Mum-of-three Jane Brass has been back at Royal Papworth Hospital as a registered nurse since May 2018, when she completed the three-month Return to Practice programme with Anglia Ruskin University. The scheme offers returning nurses the chance to get up to date with the latest skills and knowledge while making the most of the experience they already have.

Jane and her family returned to the UK when her children began to leave for university, so after qualifying as a nurse in London back in 1986 she began to look for a job. She saw an advert for Royal Papworth's Return to Practice programme and decided to find out more.

"I hadn't intended to come back – because previously it would have meant having to retrain again, but Return to Practice made it a lot easier. I think I was the one who'd been away the longest out of everyone on my course. The biggest difference now is the use of technology – the last time I was here it was all paper forms. We covered all of the main changes. On the whole the care is the same, but the turnover of care is faster."

Chatting with colleagues inside the new Royal Papworth Hospital, opening soon on the campus Picture: Keith Heppell

Jane Brass

The Return to Practice course

The national Return to Practice scheme for nurses has been run by Health Education England since 2014 and provides experienced nurses with training and a route back into the NHS. To date more than 4,200 have commenced the practice programme and over 2,400 have completed and entered NHS employment.

The Return to Practice programme in Cambridge, which is provided by Anglia Ruskin University, offers the chance to revisit clinical skills with the support of a nursing supervisor.

At the end of the programme, participants undergo a robust assessment to ensure they are competent and able to perform as a registered nurse. Once participants have passed this assessment they can be appointed as a Band 5 registered nurse.

I worked at a children's orphanage in Uganda before coming back to UK

Raych Clay, who has six children, is currently on the course and expects to become reregistered at Royal Papworth in early 2019. After graduating from Birmingham University in 1996, Raych worked at John Radcliffe Hospital in Oxford for four years before relocating to Uganda with her husband to work at a children's centre for orphans.

They moved back to the UK 10 years ago. Like Jane, Raych saw an opportunity she didn't want to miss now her children are older. She heard about Return to Practice during a chance encounter at a jazzercise class near Cambridge earlier this year.

"I got speaking to two women who it turned out were senior nurses from Royal Papworth's Alert Team. They told me about the programme and it just made sense to explore it. The hospital has good connections at ARU – I attended a selection day and started in September.

"I've spent time on the wards shadowing people, getting involved, meeting patients; I've been there absorbing and learning every single moment. Things have moved forward and changed a little bit, but at the same time I've picked up transferrable skills during my time away that I've been able to bring back with me.

"The major change is the use of technology. Twenty years ago we had one computer on the ward – most of the nurses didn't touch it. Now we use hand-held tablets and there are more responsibilities.

"I would recommend anyone in a similar position to me finds out more about the scheme – we have so much fun and it's a lovely team."

Raych Clay

Clare Oliver-Williams

Carers' scheme aided Clare

For Clare Oliver-Williams, a junior research fellow at Homerton College looking at women's reproductive health and its links to heart disease, her time away from the labs was shorter than Jane and Raych but she learnt a lot about herself.

"I was pregnant with my first son during the second year of my PhD and my supervisor made it very clear that maternity leave was my time – they didn't expect me to keep working, which was really reassuring.

"When I came back I was able to access the University's Returning Carers scheme. This provides money to people who have had a period of extended leave for caring responsibilities. The money helped to facilitate my return to work, which was really helpful.

"Having children has definitely made me more efficient – as a mum of two small boys I know I need to use my time wisely. Juggling school and nursey and all the other things which go with having a family can just eat up your time, as me and my husband have found out. Thankfully my colleagues have been great. I knew how wonderful they could be about flexible working and they knew they could depend on me to do my job. This two-way trust, built up over time, made it easier to come back to work.

"In my view, people who have had career breaks – either wanted or not – help create a diverse workforce. Whether you have gone traveling, brought up children or gone to help others, this creates a range of experiences which can help your employer.

"I've learnt from my time away from the lab that I have a huge love for my work – it makes me a happier person, which I think makes me a better mum to my children. The key to successfully returning, in my experience, is to be clear about what expectations should be for yourself and managers – information can provide so much reassurance and helps everyone."