

Putting sleeping sickness on the radar

Page 8

European stem cell ruling divides opinion

Page 3

A healthy balance

Professor Janet Thornton on juggling work and life in a science career

Page 14

Network can also be downloaded as a PDF at:

www.mrc.ac.uk/network

CONTENTS

NEWS



European stem cell ruling divides opinion 3

Boosting awareness of breast cancer in men 6

FEATURE



Putting sleeping sickness on the radar 8

MRC PEOPLE



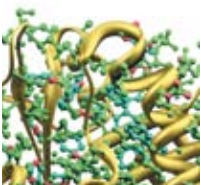
Change of director at MRC asthma centre 7

FUNDING



International brain research projects kick off 11

RESEARCH ROUNDUP



Angry when you're hungry? Blame serotonin 12

Leafy greens good for guts 13

OPINION



European Bioinformatics Institute director, Professor Janet Thornton, on work-life balance for scientists 14

COMMENT FROM JOHN SAVILL CHIEF EXECUTIVE



In a recent high profile test case, the European Court of Justice banned the patenting of inventions and therapies involving human embryonic stem cells (hESCs), or any treatments derived from them. This was a disappointing outcome which has raised concerns that commercial investment in stem cell research in Europe could be stifled by the ban.

Patents have an important role to play in encouraging and protecting industry investment in hESC research, and in helping to deliver stem cell-based therapies in the longer term. The MRC needs industry investment to translate our discoveries into treatments for patients, and many scientists fear that if inventions can't be patented, industry will invest their money elsewhere.

These concerns are valid, but it's important to keep them in proportion. The ECJ decision does not stop scientists undertaking research using hESC lines, nor does it affect the UK regulatory position. The UK is still well placed to deliver in this research area and the ban will not alter the MRC's planned £130m investment in stem cell and regenerative medicine research over the next four years. Nor, as far as we can ascertain, will it affect current private sector investment in ongoing and planned trials.

We will continue to work with our colleagues in academia, industry and government to clarify the full implications of this ban and to forge a way ahead in the new intellectual property landscape. You can read more about the MRC's response to the ECJ ruling on page 3. Meanwhile, to use the popular adage, we should keep calm and carry on.

Sir John Savill

European stem cell ruling divides opinion

Concerns have been raised in the research community that a European Court of Justice (ECJ) ruling, which bans patenting human embryonic stem cells (hESCs) and inventions derived from them, could stall commercial investment in European stem cell research.

The October ruling concerned a test case in which Greenpeace challenged the patent of a German researcher, Professor Oliver Brüstle, which protected a method for deriving nerve cells from embryonic stem cells. Greenpeace argued that patenting the technique was “contrary to public order” because it involved the destruction of human embryos.

While the ECJ ruling permits patenting of techniques which would be therapeutic for the embryo itself, it bans patenting of any procedure involving stem cells obtained by destroying human embryos. The ruling concerns the interpretation of the EU directive on the legal protection of biotechnological inventions, including the concept of what a human embryo is, which is not defined in the directive. However it does not directly comment on the ethics of research using human embryos. The decision is binding and

the UK cannot appeal against it.

Professor Brüstle, who is director of the Institute for Reconstructive Neurobiology at Bonn University, said the decision was unfortunate: “The fruits of years of translational research by European scientists will be wiped away and left to the non-European countries,” he said.

More tempered concerns were expressed by Professor Sir Ian Wilmut, former director of the MRC Centre for Regenerative Medicine in Edinburgh, who led the team which cloned Dolly the sheep: “Once a fundamental discovery has been made in the laboratory further research is required to produce a clinically safe and effective product. This is a particularly expensive part of the entire process. Companies in Europe will now be less likely to invest in this stage of the research with embryonic stem cells because they would be unable to protect their procedures.”

However Sir John Savill believes that the ECJ’s decision should be kept in proportion: “Human embryonic stem cell research can lead to successful commercial translation despite this ruling. Understandably, the stem cell research community is very concerned at the moment, and it may be some time before the impact of the ruling is known. Nevertheless, the MRC will continue to invest in this important area and will strive to ensure that the UK remains a world leader in this area of research and derives economic benefit from such support.”

Rob Buckle, Head of Regenerative Medicine at the MRC, is also more sanguine about the ECJ’s decision. While he acknowledges that the effects of the ruling may affect investor confidence, he believes there will be alternative routes to protecting intellectual property around the use of hESCs and that their use in research will continue. He also points out that while there is an ongoing need for hESC research, other forms of stem

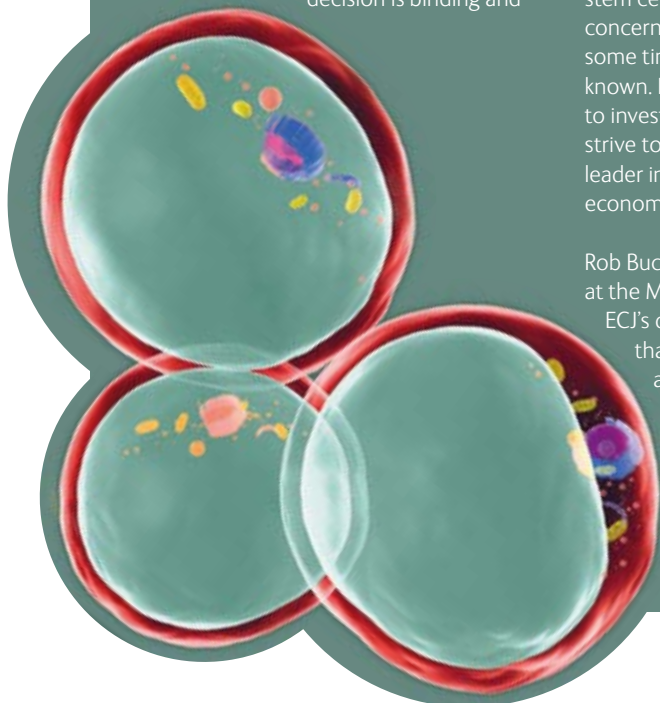
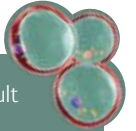
cell research, for example using adult and fetal stem cells, will not be affected.

Rob explains: “The ruling does not impact on current UK regulation of stem cell research, which has been thoroughly debated in parliament in recent years. In the UK, regulation has been carefully constructed to minimise the use of embryos for research, balancing the interests of altruistic donors with the need for research and commercial development under a tightly controlled framework.

“It should be noted that commercial research in this area is largely fuelled by small- and medium-sized companies dependent on venture capital, rather than traditional pharma. Patents may have a lesser role to play here, because the processes of developing hESC-based therapies are particularly complex and bespoke, and will be difficult for any competitor to replicate. Alternative routes are available to protect the ‘know-how’ relating to the use of hESCs. When these are considered alongside the supportive European legislation for marketing medicinal products, commercialisation may still proceed, with financial return likely to be provided through licensing deals in the longer term.”

A critical stage for this area of research will be to demonstrate proof-of-concept for stem cell-based therapies in people. With hESC-based approaches to addressing serious degenerative conditions now entering the first clinical trials, Rob says that these are exciting times: “The hope is that future successes in this area, underpinned by public sector investment from organisations including the MRC, will ultimately provide the gateway essential for future commercial investment and development in regenerative medicine.”

A statement outlining the MRC’s approach to the ruling is available at www.mrc.ac.uk/Newspublications/News



King's and Imperial join the Crick Institute as time capsule is buried

King's College London and Imperial College London formally joined the partnership behind The Francis Crick Institute in central London in October. The signing ceremony followed the burial of a time capsule at the site of the institute containing letters from leading scientists, local children's artwork and a copy of *Network*.

The brass capsule was placed 12 metres under the foundations of the institute in St Pancras and Somers Town, witnessed by the Mayor of London Boris Johnson, the science minister David Willetts MP, and the director and chief executive of The Francis Crick Institute, Sir Paul Nurse. Francis Crick's daughter Gabrielle, accompanied by several other members of the Crick family, buried the capsule.

Jim Smith, director of the MRC National Institute for Medical Research, which will become a part of The Crick when building work is complete, commented: "Future historians of science will know about NIMR's achievements through the scientific literature, in whatever form it takes in the 22nd century. Our contributions to the time capsule will provide insights into the people who worked at NIMR, and their scientific aspirations. We can only

speculate on how naïve those aspirations will appear and what advances in science will have been made when the capsule is unearthed!"

Commenting on the accession of Imperial and King's Colleges to the partnership, director and chief executive of The Crick Sir Paul Nurse said it provided "an opportunity to work with many of the best scientists and clinicians in the world."

A new visitor centre recently opened near the institute site on Ossulston Street, featuring information on the design and construction of the Institute, building models and details of The Crick's proposed research and plans to work in partnership with the community. For more information email info@crick.ac.uk.



Boris Johnson with local school children.



Members of The Francis Crick Institute Board and Executive - including Sir John Savill - join Gabrielle Crick, science minister David Willetts MP, Mayor of London Boris Johnson, and Frank Dobson MP at the burial of the time capsule.

Some of the capsule's contents:

- Francis Crick's personal number plate from California marked with the letters AT GC – the four bases in DNA.
- A letter from Sir Paul Nurse to a future president of the Royal Society
- Basic research tools; microfuge tubes, a 96 well plate, and a pipette
- Letters from eminent scientists including Aaron Klug and Nancy Rothwell
- A photo of MRC's Council taken in 2010
- A DVD of *Batman Begins* (in which the MRC NIMR building features as Arkham Asylum)
- Local children's artwork
- Copies of *Network*, *Pi* (UCL's student newspaper) and Imperial's *Reporter*
- Biographies of Francis Crick, one of which was David Willetts' personal copy
- A cobble from the Goods Yard which formerly occupied The Crick site



The time capsule is prepared for burial.

A new perspective on medical research

The MRC Annual Review 2010/11, launched online in October, explores how taking a fresh perspective on a research problem can be a catalyst for scientific discovery.

Through videos and profiles, *Perspectives* tells the stories of MRC-funded scientists across the UK who made some of the most compelling discoveries of 2010/11 by thinking about medical research challenges from a new angle.

One of these scientists, Professor Doug Turnbull, led pioneering research in human eggs which has the potential to prevent devastating mitochondrial diseases such as Leigh disease, which is fatal by early adulthood. And in a study which began with

one person who had a family history of migraines, MRC Clinical Fellow Dr Zam Cader has found the first gene to be directly linked with the disorder, opening up possibilities for new treatments which could help millions of people worldwide.

Perspectives also features a diverse selection of MRC scientists' research achievements from 2010/11. From a landmark discovery on antibodies which has overturned a century of scientific thinking, to a new way of delivering drugs to the gut using bacteria, these stories reflect another year of excellent science to add to the MRC's long and prestigious history.

Read the review at perspectives.mrc.ac.uk



Good vibrations in Bradford

A new interactive exhibit on how our ears and brain interpret sound was on show at the British Science Festival in Bradford this September, put together by staff and students from the MRC Institute of Hearing Research in Nottingham.

Using computer games and interactive demonstrations, From ear to brain shows that hearing is not just about perception. The exhibit explains how our auditory experience changes when things go wrong in the auditory system, and how IHR scientists are increasing our understanding of hearing and developing better ways of treating hearing disorders.

Young visitors were encouraged to put on headphones and hear how they might sound when they grow up, or if they were the

opposite sex; discover what it is like to communicate with others through a cochlear implant; and play with a Blue Peter-esque, do-it-yourself hearing aid made from household objects.

The IHR's Bernhard Seeber, who was one of the scientists on hand to answer questions on the science behind the fun, said: "The exhibit was highly popular with all ages, from eight to eighty. We are hoping to take this exhibit to many more science fairs and similar events in the future."

Scientists from the Mary Lyon Centre in Harwell were also at this year's festival, speaking about the value of mouse models in health research at an event supported by Understanding Animal Research.



Young visitors to the British Science Festival try out 'From ear to brain'.

Imagining the brain



This triptych, showing the structure of the brain as it appears using scanning technology, was created by school student Edward Parkhouse (18) as part of a public engagement project run by scientists from the MRC Laboratory of Molecular Biology in Cambridge.

Imagining the brain, now in its sixth year, invites Cambridgeshire pupils to create artworks to

communicate scientific topics. This year's theme was The Art of Mortality, and invited artists to explore subjects such as neurodegeneration. Edward shared first prize with Patrick Lyons (15), who created a sculpture showing the disruption of microtubules – essential components of neurons – in Alzheimer's disease. Find out more at www.endocytosis.org/ImaginingTheBrain

Boosting awareness of breast cancer in men

A new MRC-funded website section exploring the experiences of men with breast cancer was launched in October. The site's aim is to support male breast cancer patients and their families and to raise public awareness that breast cancer is not exclusively a disease of women.

Around 300 men are diagnosed with breast cancer each year in the UK. But because they make up less than one per cent of new breast cancer cases, male patients rarely meet other men with the disease and they can feel isolated. Additionally they often have to cope with surprise or disbelief from people who are not aware that the disease can affect men.

The new section, which forms part of the wider Healthtalkonline website, provides extracts from interviews with 33 men talking about their experiences of having breast cancer, including the impact on their lives and the frustrations and embarrassments associated with dealing with others' misconceptions about the disease.

Professor Kate Hunt and PhD student Caroline

Sime from the MRC Social and Public Health Sciences Unit in Glasgow carried out the interviews and put together the content for the website.

Professor Hunt commented: "It's a common misconception that men can't get breast cancer, but we are all born with breast tissue, so we all have a degree of risk. During months of interviews we heard that many had encountered difficult and embarrassing situations. For example, one man was given an information sheet before his mastectomy telling him to bring a soft bra in to wear after surgery. Healthtalkonline is a superb venture which does brilliant work, and we are very grateful to the MRC for funding this project, especially after many other funders we approached turned us down."

Healthtalkonline, run by the DiPEX charity, is a unique online database of personal and patient experiences gathered through in-depth research on over 50 illnesses and health conditions. It can be found at www.healthtalkonline.org

Max Perutz winner spotlights sleeping sickness

Amy Capes from the University of Dundee has won the 2011 MRC Max Perutz Science Writing Award. Her essay, *Putting Sleeping Sickness on the Radar*, deftly describes how her research could prevent the parasite which causes sleeping sickness from evading our immune system.

As part of the prize, Amy's article was published in *The Guardian*. This year's competition received over 100 entries from some of the UK's brightest PhD students, all eager to explain their research to a non-scientific audience in just 800 words.

The winning piece, chosen from a shortlist of 12, was announced at an award ceremony in London in September. During the evening, shortlisted entrants mingled with members of the MRC's Council, Sir John Savill, representatives from across the science community and David Willetts, Minister of State for Universities and Science.

Mr Willetts said: "Communicating research effectively is a vital skill for any scientist, and great science writing helps provide the public with accurate, evidence-based information. I've been incredibly impressed by both the standard of the essays and the breadth of topics covered in this competition."

Turn to page 8 to read the winning essay and an interview with Amy.

Revealing the true impact of the 2009 H1N1 flu pandemic

With headlines like 'Swine Flu Death Toll Rises' (*The Telegraph*) dominating health coverage during 2009, it would be easy to assume that the H1N1 flu pandemic was severe – but it has actually been categorised as 'mild' by the US Centers for Disease Control and Prevention.

A team of scientists from the MRC Biostatistics Unit in Cambridge recently published a paper in the *British Medical Journal* which examined the impact of pandemic flu in England between June 2009 and February 2010. The study definitively assessed the likelihood of swine flu infection leading to more severe disease or death. By bringing together all the available surveillance data in England, the team were able to take a robust view of the summer and winter waves of infection.

An estimated 11 per cent of the population in England were struck by the flu at some point, with 5 to 14 year olds being affected more than

any other age group. Only a third of the infections caused symptoms and the probability that the illness would lead to hospitalisation was around 0.19 per cent.

Dr Daniela De Angelis, who led the study, explained: "While adding to a body of evidence on the relatively mild nature of the pandemic, our findings also provide authoritative information on how severe the infection was, so that our health service can prepare if there is a resurgence in this particular strain of flu. Importantly, they highlight certain limitations in current surveillance schemes; this emphasises the importance of investing in reliable systems so that we can make an early robust estimation of how severe the pandemic is and make the best decisions for public health."

To read the full research paper, visit www.bmj.com.



MRC PEOPLE

Change of director at MRC asthma centre



Professor Tak Lee retired in September after six years as director of the MRC-Asthma UK Centre in Allergic Mechanisms of Asthma in London.

The centre was established in 2005 and became a unique partnership between the MRC, Asthma UK, King's College London, Imperial College London and the universities' partner NHS Trusts. Under Professor Lee's direction, the number of principal investigators at the centre has doubled and it has developed strong collaborative links with other researchers.

Professor Lee remarked: "I knew the centre would succeed when it was established six years ago, but what we have achieved has surpassed all my expectations. It has offered a group of highly motivated and internationally competitive scientists opportunities to interact and share their skills, while still preserving their scientific independence. The centre's strength lies in being integrated and working towards a common goal for patient benefit."

His successor is **Sebastian Johnston**, Professor of Respiratory Medicine at the National Heart and Lung Institute at Imperial College London.

Biochemical Society medals for MRC scientists

The 2012 Biochemical Society Colworth Medal is to be presented to **Dr Akhilesh Reddy** of the University of Cambridge, who leads a research group at the MRC Centre for Obesity and Related Metabolic Diseases.

The medal is awarded annually to a biochemist under the age of 35 for outstanding research achievement. Dr Reddy's group is interested in the molecular mechanisms of the circadian clock – the natural rhythmic changes that occur in cells and systems, including the sleep-wake cycle – and how disruption to it, through old age, neurological disease and shift-work, can cause disease.

The 2011 medal was awarded to **Dr Sarah Teichmann**, Programme Leader at the MRC Laboratory of Molecular Biology, who will present her award lecture at the Royal Society in December.

Prestigious European grant for CSC researcher

Dr Petra Hajkova, a Group Head at the MRC Clinical Sciences Centre in London, has been selected as one of eight young principal investigators across Europe this year to receive a Young Investigator's Research Integrating Systems Biology and Epigenetics (RISE1) grant.



The grants are awarded by the European Commission-funded Epigenesis Network of Excellence. This initiative aims to progress research at the interface between systems biology and epigenetics – the study of changes in gene expression or physical characteristics which are caused by things other than alterations in DNA sequence.

Petra's research group uses animal models to unravel the molecular mechanisms behind epigenetic reprogramming of cells and the involvement of chromatin, the scaffold upon which DNA is organised, in this process.

CSC Director Professor Amanda Fisher said:

"Winning a RISE award is an outstanding achievement that places Petra's work at the core of European excellence in epigenetics research."

MRC scientists elected to EMBO

The European Molecular Biology Organisation (EMBO) has elected several scientists with a connection to the MRC to its prestigious membership this year. They are: **Professor David W Holden** FRS, of Imperial College London, **Dr Xin Lu** from the Ludwig Institute for Cancer Research, **Professor Mark Marsh**, director of the MRC Laboratory for Molecular Cell Biology and Cell Biology Unit at University College London, and **Professor David Ron** from the MRC Centre for Obesity and Related Metabolic Diseases.

Birth cohort study appoints chair

Professor Dame Janet Finch has been appointed chair of a major new cohort study which will follow over 90,000 babies from birth, along with their families.



The Birth Cohort Study, recruitment for which is scheduled to begin in 2013, will track the growth, development, health, wellbeing and social circumstances of people from all walks of life. It will be carried out by scientists at University College London led by Carol Dezateaux, initially covering the period from pregnancy to the early years of life. It is the largest ever UK-wide study of babies and young children, and is funded by the Department for Business Innovation and Skills, the MRC and the Economic and Social Research Council.

Dame Janet is one of the UK's leading social scientists. She is currently Professor of Sociology at Manchester University and was formerly Vice Chancellor at Keele University. Her research expertise lies principally in studies of family relationships, especially relationships across generations.

Putting sleeping sickness on the radar

The 2011 MRC Max Perutz Science Writing Award, which asks entrants to describe their research to a lay audience in 800 words, was won by MRC-funded PhD student Amy Capes from the Division of Biological Chemistry and Drug Discovery at the University of Dundee. Here is her winning entry.

It is the start of an invasion. There is no gunfire or explosions, just the mundane tickle of a fly landing on your skin. In Sub-Saharan Africa, this moment can be just as deadly as bombs and guns if that tickle is a blood-sucking tsetse fly. As the fly bites, the tiny protozoan parasites that cause sleeping sickness rush into your blood stream. What was a brief brush of legs and wings is suddenly a potential death sentence.

Your body is now a battlefield. The parasites begin to multiply and overwhelm your defences causing waves of fever as you try to fight back. If you are lucky, you get an accurate early diagnosis and access to one of the two drugs available for the first stage of the disease. If you are unlucky you are diagnosed late, when your brain is already crawling with the parasite and you begin to lose your mind. The most commonly used drug of the three licensed for the second stage was discovered 90 years ago and is based on arsenic. There is a 10 per cent chance the drug will kill you because it is so toxic; but what choice do you have? It's a hopeless war; sleeping sickness invariably progresses to coma and death if you do not get treatment.

In Sub-Saharan Africa, the chances are you will not receive safe, effective drugs, and you will die from the disease or its treatment. The World Health Organization estimates that there are between 50,000 and 70,000 people with sleeping sickness in Africa, and that millions more are at risk. Even if a person isn't infected with the disease it still devastates lives, because it infects and kills livestock too. Sleeping sickness is a disease that is crying out for more research and better drugs. However, if we are to outwit the enemy, we need to understand what makes it such a lethal foe.

The sleeping sickness parasites are superbly designed for stealth; to succeed they must evade the defences of the human immune system. The shock troops of the innate immune

system rapidly and indiscriminately attack foreign cells, while the adaptive immune system learns the signature of each invading pathogen, and launches powerful, surgical strikes. But the surface of the parasite bristles with an incredibly sophisticated coat of armour which is made up of millions of protein chains anchored to the cell surface. The armour repels the barrage of the innate immune system, and by the time the adaptive immune system has locked on to its target, the parasite has shed the old armour and replaced it with new, different proteins. The surgical strikes never find their target. The parasite flies under the immune system radar, allowing it to silently multiply and invade the body.

But what if we could strip the parasite of its armour? The parasites would be visible and vulnerable to the immune system. My research focuses on the anchor that holds the armour's protein bristles in place on the surface of the parasite.

If the parasite cannot make the anchor, then it cannot make its coat of armour. The parasite has a production line for assembling the anchor; it is built up, piece by piece, by a series of molecular machines known as enzymes. I design and synthesize molecules that mimic the anchor at a particular stage of its production. The mimics fit into the enzyme, but instead of allowing it to add the next piece of the anchor they jam the machine and stop it working. Once the anchor production pathway is shut down, the parasite loses its armour.

Making these anchor mimic molecules is slow and laborious because we do not know the structure of the enzyme we are trying to inhibit. It is like trying to guess the structure of a lock by making many different keys and seeing how they fit. But every molecule I make brings me closer to stripping the stealth armour from the sleeping sickness parasite, and finally letting the good guys win.



The tsetse fly carries the parasite which causes sleeping sickness.

Meet the winner

Network caught up with Amy Capes to hear about her motivations and future plans.



Max Perutz Science Writing Award 2011



Above: Amy with the other shortlisted Max Perutz Award entrants and Robin Perutz, Max's son;
Above left: David Willetts MP speaks to some of the shortlisted entrants at the Max Perutz award ceremony in London.

How did you end up in medical research?

It's a long story. Originally I did a degree in Computer Art at Aberdeen University, which was extremely useful for demonstrating that I didn't want to go into a career in art! I came out realising that actually I wanted to do something with questions that could be answered in a scientific way.

Since I was quite young I've read magazines like *New Scientist* and *Scientific American* in a sort of casual interest way. Chemistry's always caught my imagination because it affects everything and it's part of everything.

So I did an undergraduate degree at Edinburgh University, which is a fabulous place to do chemistry. One of the brilliant things is that they give you six months for a research project - which is what swung it for me in deciding to do a PhD.

What inspired you to work in this field?

Sleeping sickness is a dreadful disease but the biology is also incredibly interesting and the

medicinal chemistry strategies are really interesting. Also, the fact is that, although it affects about 30,000 people a year, there's actually very little being done about it, which means that really anything that you do discover is going to be significant. Sleeping sickness medicinal chemistry is like the big black area of the map with 'here be dragons' stamped on it! It's also a grossly under-funded and under-reported field. If that was the case in a rich country there'd be an outcry.

How did you feel when you heard you'd won the Max Perutz Award?

Like my head was going up and my stomach was going down! They read out the highly commended names and when mine wasn't among them I thought "Right, I'd better just go home now". So winning was a very pleasant surprise.

And how did it feel to see your name in print?

Really good. It wasn't so much seeing my own name in print, it was more that when I told my

friends and family and they said "We understand what you do now!" My parents are both in humanities - my mum's a poet and she really doesn't understand science at all - so it was really nice for them to get a grasp of it. Getting my essay published in a national newspaper is also a good thing because people just aren't really aware of the disease. Unless you've travelled in Africa in that sub-Saharan belt, the sleeping sickness belt, you probably wouldn't know about it.

What will you do with the prize money, and what's next?

Buy a new laptop! I'm thinking seriously about going into science writing and communication. I've just submitted my thesis so I'm kind of unwinding from that which is a bit strange. But science communication is something that I really want to go into. Because while it's great carrying out the experimental work, I think quite a lot of scientists really don't communicate - and as far as the public is concerned the work doesn't happen unless they hear about it.

FUNDING

International brain research projects kick off

Eight research projects in neurodegenerative diseases such as dementia and Parkinson's disease began this summer, funded with £3.7m from an international collaboration including the MRC.

The Centres of Excellence in Neurodegeneration Research (CoEN) is an international partnership of funders which invests in innovative neurodegenerative disease research. The partnership unites neuroscientists and resources from Canada, Germany, Belgium, Ireland, Italy and the UK. Each of the newly-funded projects will last up to two years and the research undertaken will span the development of new disease models, identification of new biomarkers, and aligning clinical trial methodologies.

One of the teams, led by MRC-funded scientist Dr David Rubinsztein at the Cambridge Institute for Medical Research, will try to find genetic factors which protect against development of diseases caused by abnormal proteins in the brain. These include Alzheimer's, Parkinson's and Huntington's diseases and certain forms of motor neurone disease. Using genome scans of thousands of people and

analyses of genetic screens in the fruit fly, *Drosophila* (which shares two-thirds of its genes with humans) the scientists hope to find features which protect against neurodegenerative disease. They will then study these features in cells and animal models to understand how they work, gaining clues for the development of new treatments.

Another of the projects, led by scientists in Germany and involving Dr Mario de Bono at the MRC Laboratory of Molecular Biology, is looking at the effects of impairments to mitochondria – the 'batteries' which generate every cell's energy – and how these can impact on the connections between nerve cells. The loss of communicating networks of brain cells is one of the early stages of neurodegenerative disease, and by studying neurones in nematode worms the research team hopes to gain insights into the causes of neurodegenerative diseases in humans.

Plans for the second phase of COEN are now underway. For more information see www.coen.org/call-for-proposals.html

UK and Israel announce regenerative medicine fellowship exchange

The MRC and the Israeli Ministry of Science and Technology are to establish a joint fellowship exchange scheme to further enhance collaboration between the countries in the area of regenerative medicine.

The partners will provide matching funding of up to £50,000 each for the new fellowship exchange scheme, under the umbrella of BIRAX, the Britain Israel Research and Academic Exchange Partnership in Regenerative Medicine.

The announcement was made at a meeting in October between the Minister of Universities and Science David Willetts MP and Israel's Minister for Science and Technology, Professor Daniel Hershkowitz.

David Willetts commented: "Israel and the UK are both world leaders in regenerative medicine. Both our governments are keen to support closer cooperation. This new fellowship scheme demonstrates our commitment to doing so. It will help build a lasting bond between British and Israeli researchers. We want to see it lead to collaboration in research between our scientists."

The announcement precedes the first major UK-Israel Regenerative Medicine conference, at Ben-Gurion University of the Negev on the 22 to 23 November. The conference brings together leading scientists from both countries working in cell therapy, stem cell biology and gene therapy to learn about each other's work and forge research partnerships.

OPPORTUNITIES/FUNDING

BOARD	Deadline date	Board meeting
Population and Systems Medicine Programme & Partnership Grant (outline)	7 December 2011	Triage: 25 January 2012 Board: 29 February - 1 March 2012
Neuroscience and Mental Health Programme & Partnership Grant (outline)	7 December 2011	Triage: 13 February 2012 Board: 15 -16 March 2012
Infections and Immunity	11 January 2012	11 - 12 June 2012
Molecular and Cellular Medicine	12 January 2012	13 - 14 June 2012
Population and Systems Medicine	19 January 2012	28 – 29 June 2012
Neurosciences and Mental Health	2 February 2012	11 – 12 July 2012
RESEARCH PROGRAMMES	Deadline date	Panel meeting
Translational Stem Cell Research		
-full	30 November 2011	22 February 2012
-outlines	14 December 2011	
STUDENTSHIPS AND FELLOWSHIPS	Deadline date	Interviews
Clinical Research Training Fellowship (round 1)	19 January 2012	28 – 29 June 2012

For updates, please check: www.mrc.ac.uk/fundingopportunities

The National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) has launched a call for project and pilot study grants with a deadline of 9 February 2012. Please visit www.nc3rs.org.uk/projectgrants and www.nc3rs.org.uk/pilotstudygrants for more information.

3Rs prize

NC3Rs is inviting applications for its annual 3Rs prize for an original contribution to scientific and technological advances in the replacement, refinement and reduction of animals in medical, biological or veterinary sciences.

Sponsored by GlaxoSmithKline, the prize consists of a grant of £18,000, plus a personal award of £2,000. Highly commended entries receive a £4,000 grant and £1,000 personal award. The prize is for a piece of primary research published in a peer-reviewed journal in the last three years and is open to any researcher, in academia or industry, based in the UK.

Last year's winner was Professor Jane Hurst of the University of Liverpool, whose method of handling laboratory mice led to an improvement in their welfare and in the quality of the research for which they are used. Research she published in Nature Methods showed that by catching the mice using a plastic tunnel or cupped hands, anxiety can be greatly reduced.

The deadline for applications is 25 November 2011, and the selection panel meeting will be held on 20 December 2011. The prize will be awarded at the NC3Rs Annual Science Review meeting on 25 January 2012.

For further information contact 3Rsprize@nc3rs.org.uk

RESEARCH ROUNDUP

Low-cost drug triples smoking quit rate

A cheap drug called Tabex® can more than triple a person's chances of quitting smoking for at least a year, a clinical trial has shown. The drug's active ingredient is cytisine, a nicotine substitute found in the seeds of the laburnum tree. Tabex® has been available for more than 40 years in parts of Central and Eastern Europe – however until this study was carried out there had been a lack of robust clinical evidence of its effectiveness.

The trial was funded by an MRC-managed consortium, the National Prevention Research Initiative, and led by researchers at the Cancer Research UK Health Behaviour Research Centre at UCL and the Cancer Centre and Institute of Oncology in Warsaw. It involved 740 patients, who were treated with either a placebo or Tabex®. Of those given Tabex®, 8.4 per cent were able to abstain from smoking for a year, compared with 2.4 per cent from the group given a placebo. Those using Tabex® to try to stop smoking were 3.4 times more likely succeed than those who took the placebo.

Tabex® is much cheaper than the leading smoking cessation products in many countries, which makes it particularly suited to low- and middle-income countries where drug cost can be a deterrent for those aspiring to quit.

Lead author Professor Robert West, from UCL, explained: "We recognise that stopping smoking can be extremely difficult and we hope that by using cytisine as a substitute for nicotine, the results of this trial could help transform the health of nations around the globe by offering a practical option even for the poorest smokers."

New England Journal of Medicine (2011) 365 pp1193-1200

Leafy greens good for guts

Eating leafy greens such as broccoli, cabbage and kale keeps the gut healthy by keeping a certain type of immune cell alive, research in mice suggests. The findings increase our understanding of disorders such as inflammatory bowel disease (IBD).

Researchers from the MRC National Institute for Medical Research in London and the Babraham Institute in Cambridge fed mice a diet containing vitamins and minerals known to be essential for good health, but lacking vegetables. Over three weeks the mice lost 70 to 80 per cent of certain specialised immune cells lining the gut, called intra-epithelial lymphocytes (IELs), but their other immune cells were unaffected.

IELs are known to play an important role in keeping the gut lining healthy. They prevent 'bad' bacteria from entering the gut while maintaining the balance of 'good' bacteria which help us to break down our food.

Investigating further, the team discovered that the survival of IELs depends on chemical signals from the digestive breakdown products of a substance called Indole-3-carbinol, high levels of which are found in so-called 'cruciferous' vegetables like broccoli and cabbage. Mice engineered to lack the receptor to pick up these signals had no IELs and lost control over the bacteria living on the intestinal surface. These mice, and those on a veg-free diet, also had more gut inflammation and greater susceptibility to damage to the gut – symptoms which bear an uncanny resemblance to those seen in humans with IBD.

Senior author Dr Marc Veldhoen explains: "We don't yet know the implications of this research for humans but, interestingly, epidemiological studies have correlated a diet low in fruit and vegetables with an increased risk of IBD. Our results provide a molecular basis for the importance of nutrients from cruciferous vegetables as part of a healthy diet."

Published online ahead of print at www.cell.com, 13 October 2011

Angry when you're hungry? Blame serotonin

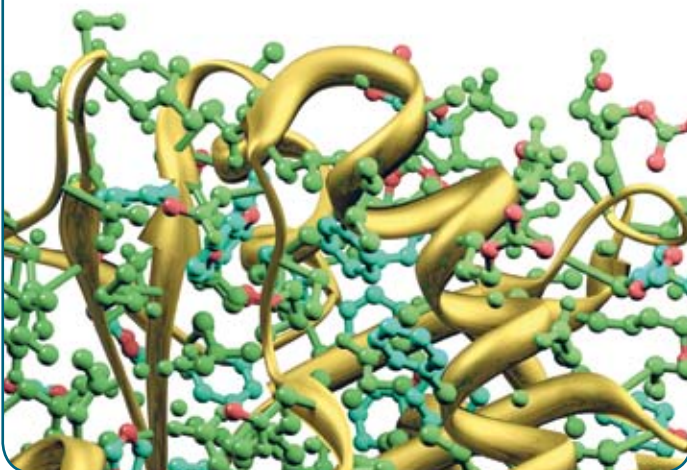
Fluctuations in levels of the brain messenger serotonin - which often occur when you're hungry - affect brain regions which regulate anger, research has shown. The findings shed light on the possible causes of certain psychiatric disorders.

Scientists at the MRC Centre for Behavioural and Clinical Neuroscience Institute (BCNI) in Cambridge manipulated the diets of healthy volunteers by giving them either a mixture of amino acids that lacked tryptophan (a key constituent of serotonin), or the same mixture but with a normal amount of tryptophan. The participants' brains were then scanned using functional magnetic resonance imaging (fMRI) as they viewed images of faces with angry, sad, and neutral expressions. The scans allowed researchers to measure how different brain regions reacted and communicated with one another as they looked at the images.

Findings showed that low levels of brain serotonin weakened communication between a part of the brain associated with emotion, the amygdala, and the frontal lobes, which regulate our emotional responses. This suggests that when serotonin levels are low, it may be harder for the prefrontal cortex to control emotional responses to anger generated within the amygdala. Those in the study who had a natural tendency to behave aggressively, as determined using a personality questionnaire, showed even weaker communication between these brain areas when their serotonin levels were depleted.

BCNI director Professor Trevor Robbins, who co-led the research, said: "These findings may be relevant for a broad range of psychiatric disorders in which violence is a common problem. We hope that our research will lead to improved diagnostics as well as better treatments for these conditions."

Published online ahead of print at
www.biologicalpsychiatryjournal.com,
15 September 2011



New urine test for adrenal cancer

A new technique for diagnosing adrenal cancer using a urine test has been developed by scientists at the University of Birmingham, with funding from the MRC.

The adrenal glands are responsible for producing steroid hormones, including cortisol, and are positioned deep inside the body, above the kidneys. Because of the glands' location, malignant adrenal tumours are hard to detect and are often only discovered at a late stage, by which time cancer cells have spread to the surrounding tissue – so a test which can pick up this disease earlier is urgently needed.

The new test uses a biomarker tool to measure the amount of steroid hormones produced by the adrenal glands, enabling scientists to distinguish between benign and malignant adrenal tumours. The team used a technique called gas chromatography/mass spectrometry to measure and compare the products of steroid hormones broken down by the body and excreted in urine. They tested samples from all over the UK and Europe, in collaboration with the European Network for the Study of Adrenal Tumours (ENS@T). Computational analysis of results produced 'fingerprints' for benign and malignant tumours, which enabled the scientists to identify the most useful biomarkers.

Professor Weibke Arlt, who led the study, explained: "Adrenal tumours affect around two per cent of the population, but the imaging procedures and blood tests currently in use for diagnosing adrenal cancer often cannot tell the difference between benign and malignant tumours, and biopsies are fairly non-informative. Our new test allows us to detect the 'hormone fingerprint' of a tumour and diagnose cancer faster and more efficiently. The next step will be to validate this test in clinical practice."

Published online ahead of print at
<http://jcem.endojournals.org>,
14 September 2011.



OPINION

Distinguished structural biologist and director of the European Bioinformatics Institute, Professor Janet Thornton, muses on juggling work and life in a science career.

A healthy balance



Finding a healthy balance between work and personal life is a struggle for anyone in a professional career, and science is no exception. This balancing act is a greater challenge for women, because even in enlightened times such as these, it is still primarily to them that the burden of childcare falls; as it was when I was bringing up my children in the 1980s. This goes some way towards explaining the 'leaky pipeline', in which diminishing proportions of women are represented as career levels progress. For example, 2005/06 figures show that women make up just 3.9 per cent of physics professors.

Does discrimination also play a part? Perhaps I was lucky as in my experience, it didn't. As a female scientist I've never suffered gender-based negativity from a colleague. If anything, being female has been a boon to my career, simply because there aren't many of us in senior roles. If you're the only woman on a programme, everyone remembers you and you are more likely to be asked to give talks and sit on committees. However, I acknowledge that others may not have been so fortunate.

Perhaps also there is an innate lack of confidence amongst female scientists who have taken a career break to start a family? Even when I was offered my current job as director of the European Bioinformatics Institute (EBI), I deliberated for a while before accepting, questioning whether I was capable of doing it. I remember thinking at the time if I was a man and I was offered this job, would I be having such a dilemma?

We all, men and women, carry a set of expectations about ourselves and others which can have a powerful influence on the choices we make. I recall reading that the Nobel Prize

winning scientist Dorothy Hodgkin left her young baby to be cared for by others while she went to work in the US. For her, there was the expectation that childcare could be left to others, but I could not have contemplated leaving my children when they were very young for any length of time. Many women scientists are keen to work part-time, like I did, or to give up work entirely to take care of their children. And of course, conversely, it can be difficult for men to choose to take on the childcare because of the weight of expectation that this is not what men have typically done in the past.

Earlier this year, I was involved in one of several worthwhile schemes set up to tackle the issues around women in science: the MRC Clinical Sciences Centre's heirloom scheme, which brought together leading women scientists and artists to create a series of heirlooms to be passed on each year to future generations of leading women scientists. And here on the Genome campus we are running a series of seminars and debates on women in science which we hope will encourage women to rise up the ranks.

A successful career in academia does inevitably involve working long hours. But it can be more flexible than other professional careers, for example, a medical doctor who has to be on the wards at certain times, or a lawyer who has

fixed appointments. I was lucky enough to be able to gain a part-time Fellowship at Birkbeck College when my children were young.

That was a balance that worked brilliantly for me. Had I taken on a full-time lectureship I would have been drawn into the administrative work and other attendant demands, and would have had less time for research. That balance of having that time to really focus on my research and also to be part of my children's lives was terrific. I was productive in my career, I met a set of people I never would have known otherwise, and having time with my family enriched my life and helped me to absorb the stresses and strains of a demanding job.

When all is said and done, whether a scientist is male or female, we all have to arrange our lives around family and work commitments and somehow keep the plates spinning. I find that maintaining a work-life balance, even now, remains a huge challenge; it's a continual battle. But science is a wonderful career and I can honestly say that I've never had a boring day – it's a privilege to be paid to really explore the frontiers of scientific understanding.

Read more about the MRC Clinical Sciences Centre's heirloom scheme at www.csc.mrc.ac.uk/PublicScience/FabricsOfLife/ScienceHeirlooms



YOUR FEEDBACK

Network is for anyone who has an interest in the work of the MRC, including scientists, doctors and health professionals involved in medical research, government departments and parliamentarians, and university staff and students. The aim is to provide a quick, easy-to-read summary of activities across the MRC, from research news through to funding, grant schemes and policy issues, with pointers to more in-depth information on websites and in other publications.

We are very keen to receive feedback on *Network* and suggestions for new features from our readers. So if you have any comments, please let us know. Just email:

newsletter@headoffice.mrc.ac.uk

Network is produced by the MRC publications team. A limited number of copies are available in print. *Network* can also be downloaded as a pdf at:

www.mrc.ac.uk/network

IMAGES

Front/Back Cover: © Eye Of Science/Science Photo Library
Page 3: © iStockphoto
Page 4: © Wellcome images
Page 6: © iStockphoto
Page 8: © Natural History Museum, London/Science Photo Library
Page 10-11: © iStockphoto
Page 12-13: © iStockphoto

Medical Research Council (Swindon office)
2nd Floor David Phillips Building
Polaris House
North Star Avenue
Swindon
SN2 1FL

Medical Research Council (London office)
14th Floor
One Kemble Street
London
WC2B 4AN

Phone (+44) (0)1793 416200

www.mrc.ac.uk

A bigger, better Network magazine

We will be refreshing *Network* for 2012, switching to a quarterly publication schedule and including more news and features. Look out for the next edition in Spring 2012.



