International impact
Collaborative research on a global scale

Opinion
Unconscious bias holds back science

Fighting like an infection
World’s most in-depth study to detect early signs of Alzheimer’s disease

A new multimillion pound study, involving the most rigorous series of tests to detect Alzheimer’s disease ever performed on volunteers, will begin this autumn.

The Deep and Frequent Phenotyping study, funded by the MRC and the National Institute of Health Research, hopes to dramatically improve the success rate of clinical trials for treatments in Alzheimer’s disease.

This landmark £6.9m research project has been designed to identify measurable characteristics, known as biomarkers, which can detect the occurrence of Alzheimer’s disease very early in the progression of the disease – when a person may have no obvious symptoms.

The multi-site team, led by the University of Oxford, will work with researchers at eight UK universities and the Alzheimer’s Society, supported by a coalition of biopharma companies. The researchers will perform up to 50 tests on 250 volunteers from Dementias Platform UK cohorts, including new tests that have never been used before to detect dementia.

Dr Rob Buckle, director of science programmes at the MRC, said: “Finding biomarkers for clinical trials is crucial for fast-tracking decisions as to whether a trial should stop or continue, and the faster we can find out which drugs work and which ones don’t, the faster we can benefit patients.”

Read more at: mrc.io/deep-and-frequent-phenotyping-study

Listen to news and views from across the MRC community in our quarterly podcast, MRC talks. Search for MRC talks on iTunes.
**Concordat on Open Research Data launched**

The research councils, alongside three other leading UK research organisations, have launched a concordat setting out clear and practical principles for working with research data. The Concordat on Open Research Data has been developed by a UK multi-stakeholder group and is a set of expectations of best practice for the research community. It provides an overall framework but does not intend to replace individual funders’ policies.

The concordat aims to establish open research data as the desired position for publicly-funded research over the long-term. It will help to ensure that research data gathered and generated by members of the UK research community are made openly available for use by others wherever possible. All published research council-supported work is expected to include a statement outlining how underlying datasets can be accessed by others.

Read more about the concordat: mrc.io/open-research-data and access the MRC data sharing policy and guidance: mrc.io/data-sharing-guidance.

**New directory of biobanks**

Following the successful registration of more than 50 biobanks, the UK Clinical Research Collaboration (UKCRC) has launched an online directory. This UK-wide resource, led by the UKCRC Tissue Directory and Coordination Centre, represents the first step in seeking to integrate national biobanking infrastructure into a searchable resource to support research activity.

The directory contains the details of biological samples and data taken from UK individuals and held in biobanks across the UK. It aims to provide a quick and efficient route for researchers to access tissue samples and data to match their research needs.

As a member of the UKCRC, the MRC works alongside the NHS, other research funders, industry, regulatory bodies, Royal Colleges, patient groups and academia to facilitate and promote high-quality clinical research for the benefit of patients.

Access the directory: directory.biobankinguk.org. Guidance and more information is available at: www.biobankinguk.org.

**Science policy opportunity**

The MRC and the Academy of Medical Sciences have teamed up for the sixth year to offer a policy internship scheme to MRC-funded PhD students. The scheme is open to all MRC-funded PhD students (based in a university, unit or institute) in their third or fourth years of study including clinicians undertaking a PhD as part of their MRC Clinical Research Training Award.

The successful interns will have a unique opportunity to join the Academy’s policy team in central London to get valuable insights into the science policy environment.

The deadline for applications is 23 October. Application forms and further details on eligibility are available at: mrc.io/mrc-ams-internship.

**Her Majesty The Queen opens Brain Research Imaging Centre**

The new £44m Cardiff University Brain Research Imaging Centre (CUBRIC) was officially opened by Her Majesty The Queen.

The Queen, accompanied by His Royal Highness The Duke of Edinburgh, was given a tour of the centre, which contains some of the most advanced neuroimaging equipment in the world to help unravel the mysteries of the human brain.

During the tour, The Queen directed a scan on one of the centre’s powerful MRI scanners. The MRC-funded ultra-high field (7 Tesla) MRI scanner produces very high resolution images of the brain, enabling detailed measurements of brain structure and function to help understand underlying disease mechanisms.

The new facility is funded by the MRC, EPSRC, the European Regional Development Fund through the Welsh Government, the Wellcome Trust, the Welsh Government and the Wolfson Foundation. Together, these investments are supporting innovation in world-class brain imaging research, including the creation of highly-skilled research jobs in Wales.

Read more about the visit: mrc.io/cubric-opening and watch a video of the 7 Tesla MRI scanner in action: mrc.io/7-Tesla-MRI.
NEWS

New Government: who's who

Following the formation of the new Government here is a quick guide to changes of relevance to medical research. The Department for Business, Innovation and Skills has become the Department for Business, Energy and Industrial Strategy (BEIS); life sciences is now covered by ministers in BEIS, the Department of Health and the Department for International Trade.

Secretary of State for Business, Energy and Industrial Strategy: Greg Clark
- developing an industrial strategy
- ensuring the UK remains at the leading edge of science, research and innovation

Minister for Universities, Science, Research and Innovation (reporting to BEIS and the Department for Education): Jo Johnson
- science and research, including life sciences
- universities and higher education reform
- innovation

Secretary of State for Health: Jeremy Hunt
- leading on mental health

Minister for Public Health and Innovation: Nicola Blackwood
- research and development
- life sciences innovation
- data, technology and cyber security
- health protection and improvement

Minister for Health: Lord Prior
- life sciences industry
- uptake of new drugs
- leaving the EU
- academic health science centres

Others
- Minister for Community Health and Care – dementia and cancer: David Mowat
- Minister for Security – “animal testing”: Ben Wallace
- Secretary of State for Exiting the European Union: David Davis

For more information please contact the MRC External Affairs team: externalaffairs@headoffice.mrc.ac.uk

Welcoming transparency of industry payments

The Association of the British Pharmaceutical Industry (ABPI) has published details of transfers of value – payments or benefits in kind – made to individual doctors, nurses and pharmacists, plus other health professionals and healthcare organisations in the UK, on a publicly accessible database.

The new database, Disclosure UK, shows industry investment from 109 pharmaceutical companies in the UK. It is an important resource alongside the Lambert agreement – a toolkit supporting university-business partnerships and research collaborations, which the MRC encourages researchers to use.

Sharmila Nebhrajani, director of external affairs at the MRC, said, “Industry is by far the largest funder of medical research in this country. We actively encourage researchers to partner with industry because it increases the value of our funding, ensures industry has access to high quality science and accelerates the speed at which findings can reach patients. The ABPI’s database is a very welcome initiative as it will aid scrutiny of the science emerging from these vital partnerships with industry.”

Access the database at: www.disclosureuk.org.uk and the Lambert toolkit at: www.gov.uk/guidance/lambert-toolkit

Support for research charities’ impact tracking

To help demonstrate the impact of investing in research, the MRC, the Association of Medical Research Charities (AMRC) and Researchfish® have extended their collaboration to strengthen charities’ capacity for collecting information about the outcomes and impact of the research they fund.

Under the two-year extension, MRC funding will allow eligible health and medical research charities represented by AMRC to use Researchfish® for free. Researchfish® is an online evaluation system that links research grants to their outputs, outcomes and impacts. Launched in 2012, it is based on the e-Val system developed and used by the MRC since 2009.

With multiple funders using the same system, now holding several years of tracking data, the collaboration opens up the ability to analyse sector-wide data. Sir John Savill said: “AMRC members support a third of the publicly-funded medical research conducted in the UK. Finding out more about the impact of research, and what leads to improvements in health, is extremely important for both the public and for policy-makers.”

To read more, visit: mrc.io/impact-tracking
From edible cancer cells to strawberry DNA extraction, the MRC Festival of Medical Research saw MRC-funded units, centres and institutes showcase their research in events and activities of all shapes and sizes. But what’s the best way to share your research and engage your audience? Isabel Baker explores some examples.

**How much does your audience care about your science?**

“One answer to this might be ‘slightly less than you do’,” says Dr Martin Christlieb, public engagement manager for the CRUK/MRC Oxford Institute for Radiation Oncology.

That’s why engaging your audience with a compelling story is so important. “Take your work, choose one or two pivotal points and then build a story that tells the tale simply and briefly,” explains Martin.

Good planning is also key to any successful engagement activity. “Start by thinking about what you want to learn and what you want to achieve. Then consider who you would like to reach, what messages you wish to communicate, what channels and activities would be best and what resources you will need.”

**Attitudes are contagious, adds Martin.** “If you stand in front of people with a fire in your eyes, a smile on your face, and animated body language, then you will project passion, and people will respond.”

**Invito people in**

Inviting people to an event is a great way to reach a specific audience. “We invited local people from the surrounding neighbourhoods to an interactive evening, to help bring the public voice into existing policy and research conversations about how our neighbourhoods affect our health,” explains Oliver Francis, Head of Communications and Knowledge Exchange at the MRC Epidemiology Unit.

“Meet the Scientists’ session, before an evening of presentations, gave visitors an opportunity to chat with researchers over a glass of wine and try out some fun activities,” says Oliver. “To keep the presentations interactive as well as informative we used a programme, called sli.do, allowing audience members to answer questions on their smartphones.”

**Take your science out**

We can’t always expect people to come to us, so it’s important that sometimes we go out to meet them. That’s what a team of scientists from the CRUK/MRC Oxford Institute for Radiation Oncology, the MRC Molecular Haematology Unit and the MRC Human Immunology Unit did, accompanied by some props and a simple message.

**Identifying how to measure success and evaluate your activities against the original objectives is important.** “Using sli.do meant we could gauge in real time how the audience responded to our presenters, with the results projected for all to see and discuss,” explains Communications Manager, Paul Browne. “At the start of the evening over half the audience was already convinced that your neighbourhood influences your health. But by the end of the evening we had convinced quite a few more.”

By discussing their work with members of the public throughout the evening the researchers gained a first-hand insight into how people perceive the role of scientific evidence in guiding public policy.

**Getting social**

Lack the time or resources to set up an event or go out there in person to find your audience? Look for established groups or activities that already reach your audience. Social media is a great way to reach big audiences online.

Professor Ian Jones, Consultant Perinatal Psychiatrist and Director at the National Centre for Mental Health, conducts his research at the MRC Centre for Neuropsychiatric Genetics and Genomics. To connect to those with lived experience of perinatal mental illness, as well as health professionals and campaigners, Ian (@jonesir) embraced the world of Twitter.

**Getting people to stop by and listen.** One captivated visitor’s cries of “science and chocolate!” induced about 1 in 10 people to stop by and listen. One captivated visitor’s response was, “What a great way to learn!”

“Many people were keen to know more about the research. “We could go on to tell them about a new antibody-based drug, being tested to block the ‘don’t eat me!’ signal sent out by mutated cells, so the immune system can destroy cancer. They encouraged participants to become the ‘mutated’ cells, sculpted from chocolate.”

Taking to their local streets and supermarkets, they started conversations with passers-by about how our immune system works and how we might be able to make it fight cancer. They encouraged participants to become the immune system and eat the ‘mutated’ cells, sculpted from chocolate.

Curious Morrisons supermarket shoppers in Swindon

MRC Epidemiology unit scientists presenting their research to a public audience

A brightly-coloured, chocolate ball representing a potentially dangerous mutant cell
FEATURE

An MRC Festival feast

The inaugural MRC Festival of Medical Research offered a feast of exciting science events hosted by 1,000 MRC researchers.

In June, 35 MRC establishments – from Scotland to The Gambia – threw open their doors or headed to local supermarkets, cafes and museums to grab the public’s attention and share their science.

During events that welcomed members of the public, school pupils, patient groups, other MRC staff and students, researchers engaged audiences at venues as varied as a rugby club in Newcastle, the Winter Garden glasshouse in Sheffield and a film screening in Cardiff.

Activities were equally diverse, including an immunology card game, ‘Question of Science’ pub quiz, drama workshop and a Brain Maze, plus two online Twitter events. The success of the Festival was down to the enthusiasm and commitment of all involved.

Next year’s MRC Festival is from 17-25 June: www.mrc.ac.uk/mrcfestival

Making sense of health studies

The MRC/CSO Social and Public Health Sciences Unit, based at the University of Glasgow, has created an interactive website to help make sense of health research.

The new ‘Understanding Health Research’ website is designed to help anyone interested in understanding a specific piece of published health research. The website asks the user a series of questions about the research and gives guidance on what these questions mean. The questions aim to encourage critical thinking about the quality of the research, such as funding sources, peer review and ethics, and guide the user towards forming an evidence-based opinion.

Dr Shona Hilton, Deputy Director, said: “Understanding Health Research is a tool that can really help people to ask the right questions to understand and evaluate research studies.”

Visit the website at: www.understandinghealthresearch.org

Handy resources

- Highlights, including short films, from the 2016 MRC Festival of Medical Research: www.mrc.ac.uk/mrcfestival
- Activity packs, templates, guidelines and reports of past activities and events: www.mrc.ac.uk/research/public-engagement
- Share your activity so others can learn from your experience: publicengagement@headoffice.mrc.ac.uk
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“More than 1 in 10 women experience an episode of mental illness in pregnancy or following childbirth. Perinatal mental illness can be severe and have significant implications for women, their families and wider society,” explains Ian.

To hear people’s thoughts and experiences of living with the condition he joined the weekly #PNDhour Twitter chat, hosted by charity PND and Me. “I was expecting it to be difficult to keep up – and was worried about being able to express difficult concepts in 140 characters – but it was great,” says Ian.

“The perspective that lived experience brings is invaluable. It’s also a reminder of why the work is so important. The research will ultimately be judged not on the impact factor of papers, nor on the total grant income it generates, but on how it has made a difference to the women with whom I was ‘chatting’ last night.”

All activities are described in more detail on our MRC Insight blog: www.insight.mrc.ac.uk

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New director joins MRC family

Professor Margaret Frame takes over from Professor Nick Hastie as Director of the MRC Institute of Genetics and Molecular Medicine (IGMM) at the University of Edinburgh.

Margaret joined the institute in 2007 and is Science Director of the Cancer Research UK Edinburgh Centre, one of the three constituent centres and units of the IGMM. Learn more about the work of the institute at: www.igmm.ed.ac.uk

Regenerative medicine awards

The UK Regenerative Medicine Platform (UKRMP) has awarded special merit prizes to two postdoctoral researchers who have demonstrated outstanding activity in providing connectivity across the Hubs and Platform to deliver its mission.

Dr Mads Bergholt, Niche Hub (Imperial College London), has led work across UKRMP Hubs around the application of Raman spectroscopy – a technique used to understand more about the make-up of materials – in stem cell behaviour and within regenerative medicine.

Dr Michael Barrow, Safety Hub (University of Liverpool), has facilitated research on stem cell tracking across UKRMP Hubs, involving synthesis of superparamagnetic iron oxide nanoparticles tracked using magnetic resonance imaging (MRI).

The prize-winners are recognised for embracing the collaborative nature of the Platform, proactively identifying opportunities to advance activity and leading creative new approaches to maximise impact.

The UKRMP is a £25m initiative, established in 2013 by the MRC, BBSRC and EPSRC, to address the key translational challenges of regenerative medicine.

Read more at: www.ukrmp.org.uk

Dr Jim Smith moving on from the MRC

Dr Jim Smith will be leaving the MRC following his appointment as the new Director of Science at the Wellcome Trust.

Jim, Deputy Chief Executive and Chief of Strategy at the MRC, and Director of Research at the Francis Crick Institute, will step down from his current roles before taking up his position at the Wellcome Trust by the end of the year.

Speaking of his time at the MRC, Jim said, “It has been a great privilege to work for the MRC, both as Director of the National Institute for Medical Research and then as Deputy CEO and Chief of Strategy. I shall miss my friends at the MRC, but I know that my new job at the Wellcome Trust will bring me into contact with many of you, and I am looking forward to building links between the two funders. We shall do great things together.”

Queen’s Birthday Honours 2016

Congratulations to the following people closely connected with the MRC, recognised in the 2016 Queen’s Birthday Honours list:

Dr Richard Treisman, Research Director, Francis Crick Institute, has been awarded a knighthood for services to biomedical science and to cancer research.

Professor Doug Turnbull, Director, Newcastle University Centre for Brain Ageing and Vitality, and Professor of Neurology, Newcastle University, has been knighted for services to healthcare research and treatment, particularly mitochondrial disease.

John Kingman, interim non-executive Chairman of UK Research and Innovation (UKRI), and Second Permanent Secretary, HM Treasury, has been awarded a KCB for public service particularly the economy.

Professor Sue Gathercole, Director of the MRC Cognition and Brain Sciences Unit, Cambridge, was awarded an OBE for services to psychology and education.

Kathy Hill White, lately Manager, MRC Unit The Gambia, was awarded an MBE for services to supporting research in developing countries.

Michele Marron, lately Director of Operations, MRC National Institute for Medical Research (NIMR), Mill Hill, was awarded a BEM for services to biomedical science.

Read more at: mrc.io/birthday-honours
Spread of deadly brain tumours stopped

Researchers at the MRC Clinical Sciences Centre have prevented spread of the most common and deadly form of brain tumours by targeting a specific protein.

Glioblastomas have thread-like stems, which can easily spread into healthy brain tissue making them hard to treat. The researchers observed cancer cells invading a mouse brain using cutting-edge ‘intravital imaging’. They saw that when healthy cells first develop mutations, brain blood vessels keep them compartmentalised to stop them spreading and causing damage. The vessels do this by producing ephrin-B2 protein which immobilises the cells.

However cancerous cells can override this signal and escape by producing their own ephrin-B2 protein which immobilises the cells.

They analysed the impact of the gene ADAM33, associated with asthma development. ADAM33 makes an enzyme attached to airway muscle cells. When the enzyme loses its cell-surface anchor, it can ‘go rogue’ around the lung causing poorer lung function in people with asthma.

Professor Hans Michael Hatchi, MRC Clinician Scientist Fellow and Associate Professor in Respiratory Medicine, led the research: “ADAM33-initiated airway remodelling reduces the ability of the lungs to function normally, which is not prevented by current anti-inflammatory steroid therapy. Therefore, stopping this ADAM33-induced process would prevent a harmful effect that promotes the development of allergic asthma for some of the 5.4 million people with asthma in the UK.”

New insights into infant blood cancer

Researchers from the MRC Centre for Regenerative Medicine have identified the cells responsible for a leukaemia that develops while a baby is in the womb.

An aggressive type of infant blood cancer, infant acute lymphoblastic leukaemia (ALL), is associated with the MLL-AF4 fusion gene, arising during pregnancy. This gene is created by DNA damage called ‘chromosomal translocation’, where parts of two different chromosomes fuse together.

To investigate the disease process, scientists bred mice with one parent carrying an inactive form of MLL-AF4 and the other carrying a gene for an enzyme that activates this fusion gene. The resulting embryos went through a pre-leukaemic state, producing more pro-B cells – precursor to a type of white blood cell.

Lead researcher Dr Katrin Ottersbach said: “Our findings reveal the first changes that take place in blood development caused by the MLL-AF4 mutation during a pre-cancerous state. This has increased our knowledge on how this aggressive disease develops and will help identify early signs of disease and points for therapeutic intervention.”

HIV vulnerability yields new drug target

A weakness detected in HIV’s protective shell by scientists at the MRC Laboratory of Molecular Biology could lead to a new drug target and the re-evaluation of existing HIV treatments.

HIV is a retrovirus, copying its RNA genome into DNA to infect cells. To replicate it acquires nucleotides, the building blocks of genetic material, from the host, while avoiding detection.

Studying the atomic structure of HIV’s protective protein shell, the capsid, and creating mutant versions of the virus to see how this altered infection, the team identified pores that open and close, sucking in nucleotides while keeping out unwanted molecules. Blocking pores with a specially-designed inhibitor molecule – hexacarboxybenzene – stopped HIV replication, rendering it non-infectious.

Lead author Dr David Jacques said: “We have already designed a prototype inhibitor that directly targets the pore. We predict that this feature may be common to other viruses and will be an attractive target for new antiviral drugs, including new treatments for HIV and related viruses.”

Controlling ADAM33 gene holds asthma therapy promise

University of Southampton scientists have discovered a potential way of preventing asthma at the origin of the disease, challenging current understanding.

They analysed the impact of the gene ADAM33, associated with asthma development. ADAM33 makes an enzyme attached to airway muscle cells. When the enzyme loses its cell-surface anchor, it can ‘go rogue’ around the lung causing poorer lung function in people with asthma.

Studies in human tissue samples and mice suggest that switching ADAM33 off reduces the features of asthma – airway remodelling (more muscle and blood vessels around the airways), twitchiness and inflammation, even when house dust mite allergen is present.

Professor Hans Michael Hatchi, MRC Clinician Scientist Fellow and Associate Professor in Respiratory Medicine, led the research: “ADAM33-initiated airway remodelling reduces the ability of the lungs to function normally, which is not prevented by current anti-inflammatory steroid therapy. Therefore, stopping this ADAM33-induced process would prevent a harmful effect that promotes the development of allergic asthma for some of the 5.4 million people with asthma in the UK.”
Talking patient data with parliamentarians

In July the MRC joined a number of other organisations in Parliament to demonstrate how patient data is revolutionising healthcare at an event hosted by the All-Party Parliamentary Group on Medical Research. MRC Senior Public Affairs and Policy Officer Grace Gottlieb explains what the session was all about.

It’s hard to overestimate the benefits of studies using patient data – they have allowed us to spot disease trends in populations, understand the causes of disease and learn how to treat patients.

In 2005 we worked with a number of other organisations to set up the All-Party Parliamentary Group (APPG) on Medical Research to provide a forum for parliamentarians to discuss medical research. So scientists, research participants and representatives like me from the MRC and other research funders ventured into Westminster to talk to parliamentarians about how vital patient data is to research.

The timing for these conversations couldn’t have been better – the Caldicott Review had been published the week before and set out recommendations for balancing patient confidentiality with the benefits of sharing patient information. We’re also supporting an independent taskforce that was launched in response to the review to improve awareness of how data can be used within the NHS. Improving trust in how our information is handled is a key aspect of this.

The APPG event showcased studies that have harnessed the vast potential of patient data to transform healthcare. For example there were representatives from the National Survey of Health and Development which celebrated its 70th birthday this year and has used health data from over 5000 people to reveal how factors like socioeconomic status are linked to disease risk and well-being.

We were also talking about the UK Biobank: a huge project that has recruited 500,000 people to improve the prevention, diagnosis and treatment of a wide range of serious and life-threatening illnesses. Researchers from the Farr Institute were also there to talk to Parliamentarians about how this UK-wide collaboration of 21 institutions analyses data to better understand the health of patients and populations.

The event was a great success, with 32 MPs and Peers attending, including former Life Sciences Minister George Freeman, interim Chair of the House of Commons Science and Technology Committee Tania Mathias, and members of this Committee, the House of Commons Health Committee and the House of Lords NHS Sustainability Committee. The next day we were delighted to see that, after researchers from the Farr Institute gave Jo Churchill MP a #DataSavesLives badge at the event, she wore the badge at Prime Minister’s Questions.

We hope the message resonated just as much with other parliamentarians, after meeting scientists and participants involved in patient data studies. In the future we plan to keep in touch with the attendees, to continue to engage them with the value of research using patient data to people across the country.

Read more on the MRC Insight blog: mrc.io/talking-patient-data
In the two years since it began, the Newton Fund has expanded to a seven-year, £735m UK investment, with partner countries providing matched resources. Isabel Baker tracked down some of the globe-trotting MRC awardees to see how their projects are progressing.

Coordinated action
International collaboration is at the heart of the Newton Fund, which is managed by the Department for Business, Energy and Industrial Strategy and forms part of the UK Government’s official development assistance. One of 15 UK delivery partners, the MRC has awarded funding to 130 projects across 10 different countries, sharing a vision of strengthening research and innovation between the UK and emerging knowledge economies.

Studying the Zika virus outbreak requires coordinated international action. Alain’s project involves clinicians diagnosing and treating people infected with the virus, and molecular virologists studying the virus. He also works with ecologists who know a lot about mosquito behaviour, and clinicians who study neurological disorders, given the association of the virus with Guillain-Barré syndrome – a disorder in which the immune system attacks the peripheral nervous system.

Alain’s team are using their molecular biology knowledge, and their facilities in Glasgow, to better understand the Brazilian isolate of the Zika virus. “We’re now at the point where we’ve developed antibodies against the Zika virus, which we hope to use in lab-based studies as well as for improving diagnoses,” explains Alain.

Collaborative solutions
Diagnosis is also the focus of a project at King’s College London. Andrew Shennan, Professor of Obstetrics, has developed a simple device to measure blood pressure and pulse, designed to be accurate in pregnant women and to detect shock. “Bleeding, infections and blood pressure problems cause most maternal deaths, and 99 per cent occur in low-income settings,” explains Andrew. “But the main cause of death is often down to poor recognition, which could be fed by early detection of problems in pregnancy.”

Suitable for use in low-income settings, it’s taken Andrew nearly 10 years to make the device accurate. Compact, robust and cheap, it is designed with low power requirements. It also contains a traffic light system, with flashing lights alerting the user to problems.

Funding from the Joint Global Research Programme for Women’s and Children’s Health in collaboration with the Department of Biotechnology in India, part of the MRC-Newton Fund partnership with India, has allowed Andrew to set up the CRADLE 3 clinical trial in 10 low-income settings. “We want to test the impact of the device in large communities where there are a lot of serious problems in pregnancy.”

Joining forces
Antimicrobial resistance (AMR) is another complex problem requiring global collaborative research efforts. “Antibiotic use is a major driver of the transfer of antibiotic resistant bacteria between humans, animals and the environment,” explains Dr Helen Lambert, Reader in Medical Anthropology at the University of Bristol, funded through the Newton Fund AMR-China Partnership Initiative.

A two-way street
Capacity building is a key component of Newton Fund activities. “It has really become an exchange on a regular basis where knowledge and tools are going from one side of the Atlantic to the other,” says Alain.

The CRADLE 3 trial team are working closely with researchers collecting data to ensure appropriate training is delivered. But the device even helps provide care closer to home. Its flashing yellow light recently alerted Andrew to an unexpected pneumonia diagnosis in his own clinic. “It was a realisation that the most experienced of us can get things wrong unless something simple alerts you to it.”

“Ultimately, why and when people take antibiotics is to do with social, cultural, psychological and economic issues – it’s not purely a microbiological or a bacterial issue.” Helen is bringing these perspectives together to develop strategies to optimise antibiotic use in China. “Until now, there’s been very little opportunity to understand how we can tailor interventions to make them appropriate for the particular context.”

Read more about the Newton Fund at: www.newtonfund.ac.uk/about and MRC-led initiatives at: www.mrc.ac.uk/research/international/the-newton-fund

Dr Alain Kohl joined forces to tackle a very real crisis across the Atlantic. “The credit really has to go to Rafael Franca and Lindomar Peña at the Flooyer-Pernambuco Research Unit in Recife, Brazil. They approached me at a time when the first cases of Zika virus emerged, looking for a Newton Fund collaborator in the UK.”

A specialist on arboviruses – viruses transmitted by arthropods – at the MRC Centre for Virus Research in Glasgow, Alain won funding from the Newton Fund UK-Brazil Neglected Infectious Diseases Partnership to work with social, cultural, psychological and economic issues.

Andrew Shennan has developed a simple device, for low-income settings, to measure blood pressure and pulse. It is designed to be accurate in pregnant women and detect shock.

Moving from the lab to the field
Andrew’s device is delivered. But the device even holds promise closer to home. Its flashing yellow light recently alerted Andrew to an unexpected pneumonia diagnosis in his own clinic. “It was a realisation that the most experienced of us can get things wrong unless something simple alerts you to it.”

“Ultimately, why and when people take antibiotics is to do with social, cultural, psychological and economic issues – it’s not purely a microbiological or a bacterial issue.” Helen is bringing these perspectives together to develop strategies to optimise antibiotic use in China. “Until now, there’s been very little opportunity to understand how we can tailor interventions to make them appropriate for the particular context.”

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Andrew Shennan has developed a simple device, for low-income settings, to measure blood pressure and pulse. It is designed to be accurate in pregnant women and detect shock.
FUNDING

'Library' of deprioritised pharma compounds opens to researchers

A collection of 47 deprioritised pharmaceutical compounds and up to £5m is being made available to academic researchers through the latest round of the MRC-Industry Asset Sharing Initiative.

The collaboration, between the MRC and six global drug companies – AstraZeneca, GSK, Janssen, Pfizer, Takeda and UCB – is the largest of its kind in the world. UK scientists can apply for MRC funding to use any of the compounds in medical research studies to investigate the underlying mechanics of disease, which may lead to the development of more effective treatments for a range of conditions.

Dr Chris Watkins, director of translational research and industry, said: “The MRC is encouraging other companies, large and small, to join in this innovative MRC collaboration designed to speed up the translation of basic science into real health benefits for patients.”

Find out more at: mrc.io/industry-asset-sharing

Boost for brain imaging methods

The EU Joint Programme in Neurodegenerative Disease Research (JPND) – of which the MRC is a founder member – has recommended funding for 10 working groups of leading international scientists to provide guidelines for the community on approaches to enhance the use of brain imaging methods for neurodegenerative disease research.

The awards will address methodological challenges for several different imaging methods, including magnetic resonance imaging (MRI) and ultrasound, as well as combined approaches.

The awards are the latest addition to a series of JPND activities designed to maximise the impact of research by aligning and building upon national programmes and initiatives, and aim to bring a more wide-ranging and multidisciplinary approach to research into the causes, treatment and prevention of neurodegenerative disorders.

For further information, visit: mrc.io/jpnd-brain-imaging

Antimicrobial resistance collaboration

£4.5m has been invested in six new UK-Chinese research partnerships looking at ways of tackling the rise of antimicrobial resistance (AMR), by the MRC, BBSRC, ESRC and through the Newton Fund.

The Newton Fund is an initiative intended to strengthen research and innovation partnerships between the UK and partner countries. The partnerships will see researchers from multiple disciplines, at six UK centres of excellence, work in collaboration with Chinese counterparts – thanks to match funding from the National Natural Science Foundation of China (NSFC).

The UK-Chinese partnerships, as part of the UK-China AMR Partnership Initiative, will bring together leading researchers from both countries – and multiple scientific disciplines – to better understand the emergence and spread of resistant bacteria, develop new interventions, and improve health and agricultural systems.

Read about the six projects awarded funding at: mrc.io/uk-china-AMR-partnership

Find out more about the Newton Fund on page 18.

Tailoring treatments to patients

Up to £15m is available to fund consortia through the MRC Stratified Medicine Initiative.

The initiative aims to drive new discovery and knowledge of disease subtypes in order to better understand disease mechanisms. This understanding will enable better tailoring of existing treatments, and development of new treatments and diagnostics, to improve patient care.

A successful consortium will address the diverse challenges posed by stratification, including methodology, study design, data handling, inclusion of potential new therapies, and application of clinical pharmacology. Patient involvement is strongly encouraged at all stages.

Aiming to address disease areas where there is a strong case for scientific advancement and major unmet clinical need, applications should stratify by response to treatment, risk, diagnosis and/or prognosis.

Each consortium should provide a dynamic platform for research to create future opportunities for further funding and collaboration, as well as engagement with industry.

The deadline for outline applications is 1 December 2016. Find out more at: mrc.io/stratified-medicine-consortia
Computational biologist Dr Shamith Samarajiwa uses multidisciplinary data science, data engineering and computational biology solutions to understand cancer development.

This is an exciting time to be dealing with biomedical data. In a world poised and waiting for personalised medicine, computational biology will help us to detect cancer sooner by realising the potential of big datasets.

I’m surprised we don’t yet understand some of the fundamental aspects of cancer development, or carcinogenesis. Across the millions of –omic datasets already available, and those that are being generated, we should have enough information to understand how these processes are regulated. The problem is that datasets are being mined at only the shallowest depth and much biological insight is unexplored or undiscovered.

It is so much easier to generate large datasets now than even just a few years ago, but we need more well-trained data scientists to help us understand these complex datasets. I gained my early data analysis skills working in the computing and informatics industry but I was keen to work in science and took a role as an analytical chemist at Unilever before studying biomedicine at Monash University, Australia.

I found that my computing skills were fairly rare in the field and I would frequently get drawn into other projects. I was involved in some of the early bacterial genome sequencing projects and one that involved sequencing the malaria parasite genome to inform vaccine development. During my PhD, my computing skills drew me into a project that involved analysing microarray gene expression data. I worked as a bioinformatician for a consortium of seven Australian universities, on top of my PhD project, looking for anti-inflammatory markers in chronic inflammatory diseases.

The Monash Institute was one of the first research institutes in Melbourne to have their own microarray scanner and, as they had no bioinformaticians, I had to offer my services! This work eventually led me to form the first bioinformatics group at the Monash Institute once I had completed my PhD.

I wanted to develop new approaches and deal with more complex problems. After a couple of years, I moved to the UK to work with Professor Simon Tavaré at the Cancer Research UK Cambridge Institute to do just that. Being exposed to Bayesian statistics, machine learning, advanced computational biology, and large –omic datasets broadened the type of problems I could tackle.

I worked on computational methods to integrate prior knowledge and different cancer datasets to improve our ability to extract meaningful biology. This work allows us to build toolkits to tackle new problems as they arise. From there, I moved to the MRC Cancer Unit to establish a new computational biology group.

I have a strong interest in studying immune and inflammatory responses, epigenetic changes and gene regulation in cancer development. One area of our research is the p53 transcription factor and its target genes, which we know to be important in a number of carcinogenic processes. We revealed the importance of p53 to the integrity of gene networks by analysing more than 300 high-throughput genomic and proteomic datasets.

Across my research and practice, a key factor for me is scientific reproducibility. This starts with encouraging experimentals to involve statisticians in designing the experiments and follows right through to the computational analysis of datasets to ensure transparency and consistency in the use of software.

The outstanding research done at the MRC Cancer Unit and surrounding biomedical campus, combined with the opportunity to make use of my existing networks and collaborations in Cambridge, played a critical role in my decision to move to the unit.

In time, we would like to build computational methods and tools that extract meaningful biology from big biomedical datasets. This will allow us to generate hypotheses and make predictions to better understand the complex processes involved in carcinogenesis.

As told to Mary-Clare Cathcart and Sylvie Kruiniger

Read more on the MRC Insight blog: mrc.io/shamith-working-life

"We need more well-trained data scientists to help us understand complex datasets"
Professors Irv Weissman and Ravi Majeti at Stanford University and Professor Paresh Vyas at the MRC Molecular Haematology Unit at the University of Oxford describe how they collaborated across the Atlantic to set up a spin-out company with multiple backers and a promising clinical trial for an antibody that enables the immune system to detect and kill cancer cells.

Irv’s team in Stanford has developed anti-CD47 – an antibody that enables our immune systems to detect and kill cancer cells. It worked in the dish, Paresh’s team found it worked in mice bearing human leukaemia cells, and now they’re conducting a clinical trial in the UK in patients with acute myeloid leukaemia (AML) – the most aggressive form of blood cancer.

"In a healthy person, mature blood cells are constantly being created and replaced in a process called haematopoiesis," Paresh explains. "In a person with AML, something goes wrong early on in this process, problem cells are created and copy themselves many times, eventually making cancer stem cells."

In most cases, our immune system is pretty good at spotting problem cells and destroys them. However, cancer stem cells, and the cells and tumours they produce, escape this clean-up process by emitting a signal that tells our immune system ‘don’t eat me’. And it works.

"We found this signal was caused by a protein called CD47," Irv tells us, "which covers the surface of the problem cells. If we could block the CD47 signal, the immune system would be able to fight the cancer stem cells and the tumours they cause."

Paresh’s team tested 500 blood samples from patients with AML and found that in every single sample CD47 was on the cell surface. Cancer changes constantly, so to find that all the samples had this in common was almost too good to be true.

"Before the drug went to trial in patients," Paresh explains, "we conducted pre-clinical tests and found that the antibody was very safe in mice and eliminated human AML cells transplanted into mice."

Irv tells us that it wasn’t easy to get to the clinical trial stage: “We really struggled to get this project funded at first. We couldn’t even get sustained research funding from the usual US government sources, much less the levels needed for two academic groups to take the work through preclinical proof-of-principle testing, preclinical toxicity testing and to apply for approval to begin trials.”

But now fortunes have turned and Irv has founded an immuno-oncology company, Forty Seven Inc., which has secured $75m in external investment to continue clinical development of this therapy.

"This has not only been an experiment in research and therapy development," says Irv, "but a test of how academic groups can fund research to, and through, early phase clinical trials."

The two are hopeful that the antibody might work in all cancers. “But there is, of course, lots of work to do to understand and realise this potential,” explains Paresh. “At the moment, we hope that this antibody becomes therapeutic for AML, changing the grim outcome for patients into the prospect of a prolonged remission with a potential cure. We also hope that this work leads our collaborations to develop new cancer and leukaemia therapies through further joint clinical trials.”

As told to Sylvie Kruiniger

This study received MRC funding as part of the Biomedical Catalyst scheme: mrc.uk/bmc-dpts

The clinical trial has also been part funded by the charity Bloodwise.

Read more on the MRC Insight blog: mrc.uk/AML-antibody

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**Fighting cancer like an infection**

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**FEATURE**
Unconscious bias holds back science

The diversity we see among PhD students isn’t currently reflected at all career stages. Dr Jim Smith, Director of Research at the Francis Crick Institute and MRC Deputy Chief Executive and Chief of Strategy, talks about how being aware of our unconscious biases could help to change this balance to benefit science.

About 50 per cent of people working on PhDs are women, and the percentage is about the same for postdocs, but when you get to group leader positions, the number of women plummets. Men and women are equally good at science, so if women are leaving the profession we’re losing some of our best scientists.

Other factors also unfairly affect a scientist’s chances of success – including their ethnicity, sexuality and whether they have a disability. My message is that science, and all careers, must be accessible to whoever wants to do them.

Take an identical CV submitted by Mohammed and Jim – Jim is more likely to be shortlisted. And the CV submitted by Jim is more likely to succeed than Jane’s identical CV. Bias not only applies to recruitment, but also has implications for interactions with colleagues: whether people are listened to in meetings, who works on which task, how pay is negotiated or resources allocated, and so on. Becoming aware of what you are doing is the first step to addressing prejudices and preconceptions.

My parents, whom I loved deeply, had their quirks with respect to gender, race and politics. Like it or not, consciously or unconsciously, you inherit some of these judgements. It is important not to be ashamed of these biases, but rather to be aware of them and to take steps to overcome them which is why we’re rolling out unconscious bias training to our peer reviewers as well as members of our boards and panels.

The MRC came into being circa 1913. I can’t tell you about its track record on gender equality for its first 80 years, but the truth is it was probably like most other organisations at that time. However, over the last 20 years the MRC has been making a difference. For example, the MRC pension fund was one of the first to enable employees to nominate a same sex partner to receive benefits should they die in service, we removed time restrictions for applying for awards and fellowships after completing a PhD and the MRC National Institute for Medical Research – one of the institutes that has become part of the Crick – was one of the first research institutes to be awarded an Athena Swan award.

However, we can’t ignore that female representation on the MRC’s Management Board and the Crick’s management team is bad. Seven of the MRC’s eight-strong Chief Executive and Management Board are male, eight of the Crick’s 11 board members are male, and 13 of its 17 Executive Committee members are male. The MRC Management Board has a slow turnover and the small numbers skew things a little but one of the things we say at the Crick is that ‘we are where we are’ and we have to work from there. We think about it a lot and, in the long run, we hope to be able to do something about it.

Too frequently, people see gender equality as a female concern. It’s important for men to help make the point that this isn’t simply a ‘women’s problem’: it’s a problem for science and society.

Find out more at: mrc.io/equality-diversity-inclusion

Adapted with permission from the original interview ‘Why science needs women and men’ published by International Innovation on 11 May 2016. Author, Karen Lindsay.
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 keen to receive feedback on Network and suggestions for new features from our readers. To share your views email network@headoffice.mrc.ac.uk

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