Blood donation: the lifeblood of the NHS

Opinion: How secure data sharing can help us treat dementia

Network can also be downloaded as a PDF at: mrc.ukri.org/network
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**COMMENT FROM Fiona Watt**  
**EXECUTIVE CHAIR**

As the UK Research and Innovation Champion for Talent and Skills, I’m passionate about supporting researchers at the most pivotal points of their careers. It seems clear that we should be investing in the best people, regardless of career stage and geography.

To help build expertise and opportunities for future careers, we’re adding more activities to the list of those eligible to researchers employed on MRC grants, to cover activities that do not directly relate to their specific research project.

Supporting the career development of research staff is equally important as supporting our researchers. That’s why we’ve introduced a new ‘research co-investigator’ status for research staff on MRC grants, to provide recognition for their intellectual research contributions and to help career development (see page 3).

Sharing data and recognising individual research contributions are vital, especially for early-career researchers. I’m pleased to see the Dementias Platform UK leading the way with their data portal – a secure platform for sharing and analysing dementia research data. They are adopting a system to ‘badge’ the contribution of everyone in the team behind publications that involve use of their portal (see page 22).

By nurturing our researchers and research staff we can continue to support high-quality research for better health.

**Professor Fiona Watt**  
**MRC Executive Chair**
New grant application status recognises research staff contributions

To support development and career progression, the MRC has introduced a new status of 'researcher co-investigator’ to recognise the contributions of research staff on grant applications.

Applicants ineligible to be a principal investigator or co-investigator have historically had little formal recognition of their contributions to the grant application and subsequent funded research. This has created a barrier to career progression for affected research staff, such as postdocs, technicians and clinical fellows.

By introducing the researcher co-investigator status, we hope to provide research staff with recognition for their research contributions, to assist with their career progression.

In addition to receiving recognition, those listed as a researcher co-investigator should be supported in their training and development throughout the grant, serving as a step towards their desired career.

For further information visit: mrc.io/rcoi

magazine going digital

After 15 years, this issue of Network magazine is our last printed issue. But you can still find all our content online on our website and blog.

Since spring 2003 we’ve published 64 issues. Times have changed, and our online subscriber numbers have grown to the extent that we feel going digital is the way forward.

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Back issues

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Feedback

As always, we love receiving your feedback. If you have any questions, comments or ideas please share them with us at: network@headoffice.mrc.ac.uk

Our website: mrc.ukri.org  •  Our blog: mrc.ukri.org/blog
New scheme for overseas researchers to come to the UK

A new scheme allows researchers, scientists and academics from outside the European Economic Area to come to the UK for collaboration, training and work experience for up to two years.

The ‘UK Research and Innovation (UKRI) Science, Research and Academia’ scheme, added to the Tier 5 (Temporary Worker – Government Authorised Exchange) visa route in July, has been introduced to increase efficiency and better suit the needs of researchers in the UK.

Operated by UKRI it enables approved research organisations to directly sponsor a broad range of researchers – including specialist technicians – to work and train in the UK. The scheme complements the Sponsored Researchers Tier 5 scheme that applies to UK universities, and which has been updated in line with the new scheme. UKRI will monitor the 12 approved sponsor organisations.

UKRI Chief Executive Professor Sir Mark Walport said: "Research and innovation is inherently international, as are the unprecedented 21st century challenges we must address."

"Global collaboration through the movement of talented people plays an essential role in meeting these challenges and this new scheme will provide further support for international researchers to work and train in the UK."

Read more: mrc.io/ukri-scheme

Direct specific questions to: Linda.Holliday@mrc.ukri.org

Happy birthday to the NHS!

On 5 July, the NHS celebrated a historic milestone – its 70th birthday. Since its creation in 1948, the NHS has delivered a free healthcare service based on clinical need.

Professor Fiona Watt, Executive Chair of the MRC, said: "MRC-funded research underpins many of the world-class treatments and methods of diagnosis used within the NHS today.

"Our close relationship with the NHS has given, and continues to give, MRC-funded researchers the data, resources and inspiration they need to carry out life-changing research that makes a real difference to clinical practice."

To celebrate, we've launched an NHS 70 timeline showing a selection of MRC research that has improved NHS treatment and services: from setting up a national network of blood banks at the beginning of the World War II, to treating a rare liver disease in 2016.

Explore our NHS 70 timeline: mrc.io/nhs-timeline

Turn to page 6 to read about blood donation’s beginnings.

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UK and India joining forces for global health

Seven multidisciplinary research partnerships between the UK and India will lead projects to address the health needs of women and children in disadvantaged populations globally.

Researchers in Ethiopia, Uganda, The Gambia, Zambia and Nepal will work with the seven partnerships to ensure that the results meet each country’s needs.

The teams will receive a total of £10m under the Global Research Programme on Health initiative.

Alex Harris, International Programme Manager at the MRC, said: "Every year, worldwide, 2.7 million babies die during the first 28 days of life and 99% of all maternal deaths occur in developing countries. Creating environments for healthy pregnancies and infant development is a major priority for global health research. This exciting initiative will see the UK and India join forces to tackle this key global health challenge."

The MRC and the Economic and Social Research Council (ESRC), both part of UKRI, are delivering the programme in collaboration with the Department for International Development and India’s Department of Biotechnology, under the Newton-Bhabha Fund.

Read more about the projects: mrc.io/uk-india

Health data: first UK snapshot review

Health data research is a complex and flourishing area in the UK, as highlighted in a new MRC report.

The Mapping the Landscape of UK Health Data Research and Innovation report details key activities and major investments made by UK public funders, government, charities and universities.

Commissioned in 2017, the report is a snapshot of activity in a fast-moving sector. It provides a unique window into major investments made by 26 research organisations, and informed the establishment of the new MRC-funded national institute – Health Data Research UK (HDR UK). HDR UK’s mission is to make game-changing improvements in the health of patients and populations through data science research and innovation.

The report acts as an important benchmark to help inform funder strategy, prevent duplication and encourage collaboration in the informatics sector, both within the field and for external stakeholders.

Dr Rob Buckle, Chief Science Officer at the MRC, said: "This report highlights what a diverse and exciting area health data research is. This sector is thriving and, in addition to its importance for promoting health and wellbeing, has huge potential to help deliver the UK Industrial Strategy, making the UK a global leader among the industries of the future."

Read more at: mrc.io/hdruk-snapshot
Blood donation: the lifeblood of the NHS

As the NHS turns 70, Petra Kiviniemi delves into the MRC archive to reveal a history of blood donation closely intertwined with the birth of the NHS.

Every two seconds, someone needs blood. Blood donations help millions of people, and many would not be alive today if it wasn’t for the generosity of donors and care by our NHS.

But the experience of being a volunteer blood donor was a very different picture back in the 1920s. Back then, nearly a century ago – and more than 20 years before the birth of the NHS – donations needed to be directly transferred from one person to another.

Donor and recipient lay side-by-side in hospital beds, with needles in their arms connected by tubes. The procedure took hours. Doctors were reluctant to use blood thinners, so sometimes the blood would need to be passed via a cup, manually stirred to prevent clotting. And as a volunteer donor you could be called upon at any hour, summoned by police officers knocking on your door.

Since then, the process of blood transfusion and donation has advanced significantly with new techniques, technologies and processes – driven by discoveries in medical research and new innovations in deliveries of service.
The first volunteer

The world’s first voluntary blood donation service was set up in London in 1921, by Percy Lane Oliver. The Honorary Secretary and a founding member of the Camberwell Division of the British Red Cross, Percy had set up and run four local refugee hostels with his wife to help those fleeing persecution during World War One.

After the War, he received a call at the Red Cross from King’s College Hospital, who were in urgent need of a volunteer to give blood. He went to the hospital, where nurse and Red Cross worker Sister Linstead became the first voluntary blood donor.

Percy was so inspired by this experience that he established a panel of local blood donors. The deal: they could be called upon to give fresh blood whenever it was needed, without receiving payment for their donation.

A free blood transfusion service

The British Red Cross Blood Transfusion Service solved the problem of sourcing blood and provided a transfusion service available around the clock. It was called upon 13 times in its first year. However, word soon spread and by 1925 they were receiving over 400 annual calls for assistance.

In 1938, just before World War Two, Britain faced the threat of war and imminent air raids. In response, the MRC prepared to establish four blood depots in London. Soon after, the War Office created the Army Blood Supply Depot in Bristol. Instead of having to rely on bleeding military personnel on the frontline, they could supply wounded soldiers at the battlefront with blood from central blood bank stores.

Filling the blood banks

The plan was a tremendous success. Blood could be collected and stored in large quantities and refrigerated in bottles ready to deliver wherever it was needed.

But vast numbers of donors were required to supply the demand for the blood they were now capable of stockpiling. So the MRC launched a nationwide campaign for new donors to come forward. The appeal – via newspaper, pamphlets, medical journal adverts, radio and cinema – was an unprecedented success. 100,000 donors registered within the first month.

A national health service

By this time, blood transfusions were no longer reserved for emergencies and were incorporated into routine surgery in hospitals. Both donors and recipients had their blood types tested to search for matching pairs.

Previously, Type O had been thought to be universally safe for all transfusions. But the discovery of more blood groups proved this wasn’t the case. After the discovery of the Rhesus factor in 1941 in New York, the MRC Blood Group Unit in London carried out extensive research, identifying the antigens that make up the Rhesus system of blood groups. Some of these groups were much rarer than others, and matches were more difficult to find, but for most people finding a match was relatively simple.

After the War the Ministry of Health took control of the regional blood banks and created the National Blood Transfusion Service of England and Wales – in September 1946 just before the birth of the NHS in 1948.
Blood donation today

From a fledgling arm-to-arm ordeal, the service has evolved into NHS Blood and Transplant – with 1.3 million registered blood donors today.

And 70 years on, it’s still crucial that the NHS has a consistent, regular supply of fresh blood. In the UK, there’s usually less than a week’s supply of fresh blood in our blood banks at any one time. So as part of the celebrations for the NHS’s 70th birthday, people are being encouraged to give the NHS a present by signing up to be a blood donor.

Many people still don’t know their own blood type, but you can find out by registering. And unlike in 1925, you can book a donation slot that’s convenient for you.

When Percy Lane Oliver had his spark of inspiration almost a century ago, he surely couldn’t have imagined what an incredible service we’d have today.

*This article was originally published on the National Institute of Health Research (NIHR) blog: [www.nihr.ac.uk/blogs/blood-donation-the-lifeblood-of-the-nhs/8978](http://www.nihr.ac.uk/blogs/blood-donation-the-lifeblood-of-the-nhs/8978)*

You can register to be a blood donor at: [www.blood.co.uk](http://www.blood.co.uk)

Blood donation of the future

- The NIHR has invested £15.1m in NIHR Blood and Transplant Research Units which have research partnerships with universities. Earlier this year the Red Blood Cell Products unit at the University of Bristol discovered a way of generating red blood cells with rare blood group types in the lab using genetic engineering. This process could one day be used to help patients who cannot be matched with donor blood: [mrc.io/lab-made-blood](http://mrc.io/lab-made-blood)

- The INTERVAL study, jointly funded by the MRC, NIHR and NHS Blood and Transplant, found that giving blood more frequently – up to every eight weeks for men and every 12 weeks for women – has no major side effects and could help to increase blood stocks: [mrc.io/interval-study](http://mrc.io/interval-study)

- At the MRC Molecular Haematology Unit, over 100 scientists are working closely with local NHS services to understand how mature blood cells are normally made from stem cells, and how production is disrupted in blood diseases such as leukaemia and Von Willebrand disease (the most common bleeding disorder): [mrc.io/mrc-mhu](http://mrc.io/mrc-mhu)
Royal recognition for Nobel Prize-winner

The 2017 Nobel Prize in Chemistry winner, Dr Richard Henderson of the MRC Laboratory of Molecular Biology (MRC LMB), was made a Companion of Honour in the 2018 Queen's Birthday Honours.

Richard, a molecular biologist and biophysicist, was awarded the honour for his services to science through his work in developing cryo-electron microscopy (cryo-EM).

Richard commented: “It is a great honour to be named as a Companion of Honour, following in the footsteps of other MRC LMB scientists and my undergraduate teacher from Edinburgh, Peter Higgs.”

A maximum of 65 people can be a Companion of Honour at any one time, making it an exceptionally prestigious award.

Find out more: mrc.io/queen-honours-2018

Read about how scientists are using cryo-EM to image the herpes virus on page 16.

New EMBO members

Four MRC scientists have been named in the European Molecular Biology Organisation’s 2018 list of outstanding life scientist members:

Professor Petra Hajkova, Head of the Reprogramming and Chromatin group, MRC London Institute of Medical Sciences

Professor Ewa Paluch, Group Leader, MRC Laboratory for Molecular Cell Biology at UCL

Dr Lori Passmore, Head of the Mechanisms of Macromolecular Machines group, MRC Laboratory of Molecular Biology

Dr Felix Randow, Head of the Cell Autonomous Innate Immunity group, MRC Laboratory of Molecular Biology

For more information visit: mrc.io/embo-2018

MRC scientists made Fellows of the Royal Society

MRC-supported researchers are among the 60 eminent scientists elected as Fellows of the Royal Society:

Professor Vincenzo Cerundolo, Director of the MRC Human Immunology Unit at the University of Oxford and Deputy Director of the MRC Weatherall Institute of Molecular Medicine at the University of Oxford

Dr Judy Hirst, Deputy Director of the MRC Mitochondrial Biology Unit, University of Cambridge

Dr Vassilis Pachnis, Senior Group Leader at the Francis Crick Institute

Professor Charles Swanton, Senior Group Leader at the Francis Crick Institute and Director of the Cancer Research UK Lung Cancer Centre of Excellence at UCL

Find out more: mrc.io/royal-society
Academy of Medical Sciences Fellows elected

Congratulations to the 13 MRC-supported scientists among the distinguished medical researchers elected as Fellows of the Academy of Medical Sciences in 2018.

Professor Eleanor Barnes, Professor of Hepatology and Experimental Medicine, University of Oxford and MRC Senior Fellow

Professor David Beeson, Professor in Molecular Neurosciences, MRC Weatherall Institute of Molecular Medicine at the University of Oxford

Professor Simon Griffin, Programme Leader at the MRC Epidemiology Unit, University of Cambridge and Professor of General Practice at the University of Cambridge

Professor Giles Hardingham, City of Edinburgh Professor of Pharmacology; Associate Director, UK Dementia Research Institute, University of Edinburgh

Professor Frank Kelly, Deputy Director of the MRC-PHE Centre for Environment and Health, King’s College London

Professor Giovanna Lombardi, Professor of Human Transplant Immunology at the MRC Centre for Transplantation, King’s College London

Professor Keith Matthews, Member of the MRC’s Neurosciences and Mental Health Board and Professor of Parasite Biology at the University of Edinburgh

Professor David Rowitch, Senior Investigator, Wellcome-MRC Cambridge Stem Cell Institute, University of Cambridge

Dr William Schafer, Programme Leader, MRC Laboratory of Molecular Biology

Professor Jesper Svejstrup, Senior Group Leader, The Francis Crick Institute

Dr Sharon Tooze, Senior Scientist, The Francis Crick Institute; Honorary Professor, University College London

Dr Pauline Williams, UK Research and Innovation Council Member and Senior Vice President and Head of Global Health R&D, GlaxoSmithKline

Professor Catherine Williamson, Member of the MRC’s Population and Systems Medicine Board and Professor of Women’s Health, King’s College London

Read the full list on the Academy’s website: mrc.io/ams-fellows2018
Board and panel member vacancies

Are you interested in contributing to the funding decision-making process? We invite applications from scientists with the relevant expertise and experience to become members of our boards and panels from April 2019. We are seeking to fill up to 20 vacancies on the four MRC research boards and up to 19 vacancies on five MRC panels. The deadline to apply is Monday 1 October 2018.

Find out more: mrc.io/board-panel-vacancies

The MRC and the Academy of Medical Sciences (AMS) have teamed up to offer a policy internship scheme.

The scheme, in its eighth year, offers MRC-funded PhD students the opportunity to undertake a three-month internship at the Academy offices in central London. The successful interns will join the Academy's policy team to lead on a piece of policy work such as a consultation response, and to assist with ongoing policy projects, delivering workshops, and stakeholder and parliamentary liaison. The scheme is open to all MRC-funded PhD students (based in a university, unit or institute) in their third and fourth years of study including clinicians undertaking a PhD as part of their MRC Clinical Research Training Award. Application forms and further details on eligibility and how the scheme is financed are available online. Application forms should be submitted with a CV, a covering letter and an article of no more than 800 words on a topical science policy issue.

Applications are welcome from the 3 September 2018 until midnight 1 October 2018.

Interviews will take place on 7 November 2018.

For more information visit the MRC website at: mrc.io/mrc-ams-internship
For details of the application process visit the AMS website at: www.acmedsci.ac.uk/about/administration/internship-schemes
MRC Festival: Bringing research to life

Are you interested in coming along or taking part in next year’s MRC Festival of Medical Research? Deborah Barber explores some 2018 highlights and shares tips learnt along the way for making public engagement a success.

For the last three years we’ve kicked off our summer with the MRC Festival of Medical Research. This year, over 10 days in June, 43 events were held by MRC institutes, units and centres, and teams of MRC grant holders.

Sharing science

Public events are a popular way to share research. But knowing the audience is key. Scientists from the University of Sheffield organised a family-friendly day with hands-on activities as a hook for discussing their research.

Professor Marcelo Rivolta’s activities showed the structures inside the ear to illustrate his research about stem cells in deafness. Visitors looked inside the ears of gerbil skull models through a microscope. And the children weren’t forgotten – with ears to colour and 3D models to build. "I think it’s really important to show that anyone, irrespective of their gender or background, can be a scientist," explains Marcelo.
New perspectives

But it’s not just about the visitors learning new things. Engaging with, and listening to, the public can provide scientists with new perspectives on their research.

For MRC Harwell, hosting an open day enabled researchers, students and technicians to highlight their work and show how their laboratory mice are cared for. Over 500 people participated in interactive activities and attended talks about genetics research.

Postdoc Dr Petrina Lau shares her highlight: "A nine-year-old brought her younger sister over, then pointed at the neurons I’d shown her and explained their features."

Support is available for researchers keen to get involved in public engagement. "I attended an MRC public engagement course which helped me think about the visitors and frame my responses to what they may ask," says Marie Hutchison, responsible for managing the care and welfare of the mice at the MRC Mary Lyon Centre.

"It's really important to show that anyone can be a scientist."

Involving the community

MRC Unit The Gambia at the London School of Hygiene & Tropical Medicine showcased their scientists’ achievements through talks and interactive demonstrations. Over 200 people came, from community elders to influential politicians, to hear about tuberculosis (TB), nutrition and disease control research.

Discussing TB with the community is vital to help patients access treatment and encourage participation in research. "It was an opportunity to discuss misconceptions about the spread of TB and debunk stigmatising attitudes," explains clinician Dr Olumuyiwa Owolabi. "We need the involvement of the community – we cannot end TB alone."
Educate and inspire

Attracting and inspiring new talent is important. And events for young adults can give them a glimpse into a researcher’s world. The MRC Centre for Global Infectious Disease Analysis invited students for a hands-on disease outbreak simulation, teaching them about infections and the associated societal issues.

Being proactive in starting discussions is vital, as Dr Caroline Walters explains: “Asking open-ended questions provides feedback to help you convey your message effectively.”

Ambitious students asked career-related questions to explore their options. “We picked presenters from different backgrounds to show that there isn’t one path to a career in epidemiology,” says Research Assistant Lazaro Mwandigha.

Hit the road (or web)

Taking activities to everyday places allows people to meet and speak to scientists, an opportunity they may not otherwise have. MRC-funded researchers and staff from the University of Oxford* united to deliver another ‘Science in the Supermarket’ roadshow. Across six locations, they chatted with shoppers about tax-funded genome editing research.

The team designed their activities for young children, but by being flexible with their activities, they successfully catered to all ages. “A competitive family came by, so we adapted things and created games that kept them engaged,” describes Tim Coutts, an administrator for cancer-related clinical trials.

Online events are another great way to engage with the public. Liza Selley, along with 24 other MRC-funded researchers and support staff, connected with over 1,400 UK school students online through the ‘I’m a Scientist…’ MRC Festival Zone.

There’s just one last recurring piece of advice: get stuck in and have fun!

Next year’s MRC Festival of Medical Research will take place from 13-23 June 2019. Read about Liza’s experience on our MRC Insight blog: mrc.io/im-a-scientist Public engagement resources and guidance are available on our website: mrc.ukri.org/engage

* MRC Human Immunology Unit at the University of Oxford, MRC Molecular Haematology Unit at the University of Oxford, CRUK/MRC Oxford Institute for Radiation Oncology and MRC Weatherall Institute of Molecular Medicine at the University of Oxford.
£900m for future leaders

In June, Business Secretary Greg Clark unveiled a major new £900m investment in the UK Research and Innovation (UKRI) Future Leaders Fellowship Scheme.

The inaugural UKRI Future Leaders Fellowship Scheme will deliver the funding over the next 11 years, with six competitions to fund at least 550 fellows over the next three years.

The investment will provide up to seven years of funding for early-career researchers and innovators, including support for part-time awards and for those returning from career breaks. It will provide flexibility for researchers and innovators to tackle ambitious and challenging research questions.

The fund, which is part of the single biggest investment in science in 40 years, helps move the UK closer to its ambition to invest 2.4% of GDP in R&D by 2027.

UKRI Chief Executive Professor Sir Mark Walport said: "Talented people are the energy and engine of new knowledge, new ideas and new opportunities. This long-term investment means the UK will continue to attract and grow the very best, supporting those who want to solve the most difficult questions whether they are in frontier science, our evolving society or our changing economy."

Read the full story at: www.ukri.org/news/flf/

£12m to tackle superbugs

Four UK universities have been awarded grants totalling £12m for interdisciplinary research into the drivers behind antimicrobial resistance (AMR) in low and middle-income countries.

Teams from the University of Bristol, the University of St Andrews, the Liverpool School of Tropical Medicine and the University of Glasgow will collaborate with researchers and policy makers in Kenya, Tanzania, Uganda, Malawi and Thailand.

Using a combination of different research approaches, the consortia aim to improve future interventions for preventing the spread of infections and resistance.

Dr Jonathan Pearce, Head of Infections and Immunity at the MRC, said: "Antimicrobial resistance is a complex and fast-evolving issue for healthcare and agriculture worldwide. These kinds of international, collaborative research projects are absolutely crucial to developing our understanding and finding solutions."

The AMR in a Global Context Consortia awards are jointly funded by the cross-research council AMR initiative and the National Institute for Health Research’s Global Health Research Programme.

Find out more: mrc.io/12m-superbugs
**Nobel Prize-winning tech reveals how herpes virus infects people**

Researchers have used Nobel Prize-winning cryo-electron microscopy to reveal how the herpes virus infects people.

Scientists at the MRC-University of Glasgow Centre for Virus Research hope their findings could lead to the development of new drugs to treat herpes viruses, which cause diseases including cancers and severe illnesses in unborn children.

Herpes viruses cause infections by introducing their DNA into human cells. But being only 1/10,000th of a millimetre in diameter, only a powerful electron microscope could reveal the specific shape of the, protective shell in which the DNA is packaged, called the capsid.

Now, scientists have discovered the shape of an important structure called a 'portal'. The herpes virus uses the portal to pump its DNA into capsids, then uses the same machinery to inject viral DNA into human cells.

Study lead, Dr David Bhella, said: "Cryo-electron microscopy, combined with new computational image processing methods, allowed us to reveal the detailed structure of the unique machinery by which the virus packs DNA into the capsid. The DNA is packed very tightly, reaching a pressure similar to that inside a bottle of champagne."

Published online at: www.journals.plos.org/plosbiology, 20 June 2018.

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**Potential therapy identified for common cause of dementia**

Early-stage research in rats has uncovered a potential approach to treat a common cause of dementia and stroke in older people – small vessel disease (SVD).

The condition is responsible for almost half of UK dementia cases and around one in five cases of stroke.

Scientists from the MRC Centre for Regenerative Medicine and the UK Dementia Research Institute, both at the University of Edinburgh, found that SVD occurs when cells lining the small blood vessels in the brain become dysfunctional. This causes them to secrete a molecule that stops production of the protective layer surrounding brain cells – called myelin – leading to brain damage.

By treating rats with drugs that stop blood vessel cells from becoming dysfunctional, the team reversed the symptoms of SVD and prevented brain damage.

As well as linking small blood vessels and changes in the brain to dementia, according to lead author Professor Anna Williams of the MRC Centre for Regenerative Medicine: "It also shows that these changes may be reversible, which paves the way for potential treatments."

Published online at: www.stm.sciencemag.org, 4 July 2018.
Eye drops with turmeric extract could treat common eye disease

Curcumin, extracted from the spice turmeric, could be used in eye drops to treat the early stages of a common eye condition called glaucoma.

Glaucoma affects over 60 million people worldwide. The condition involves the loss of a type of nerve cell – retinal ganglion cells – located near the surface of the retina in the eye. Curcumin has been shown to protect these cells when taken orally, but poor absorption means patients need to take over 20 tablets daily.

MRC-funded researchers from UCL and Imperial College London added curcumin to eye drops in a new ‘nanocarrier’ which allows large amounts of curcumin to be administered directly to the eyes. When given daily to rats with glaucoma, retinal ganglion cell loss was reduced and there were no side effects.

Lead author, Professor Francesca Cordeiro, said: “Curcumin is an exciting compound that has shown promise in numerous eye and brain conditions from glaucoma to Alzheimer’s disease, so being able to administer it easily in eye drops may end up helping millions of people.”

Published online at: www.nature.com, 23 July 2018.

Controlled gene therapy restores function after spinal cord injury

By developing a switch to control delivery of a new gene therapy, MRC-funded researchers at King’s College London collaborating with the Netherlands Institute for Neuroscience have restored paw function to rats with spinal cord injuries.

Spinal cord injuries can be devastating for sufferers. Regaining hand function is the top priority for patients to improve their quality of life, but there are currently no treatments able to restore full function.

Following spinal cord injury, dense scar tissue stops nerve cells from making new connections. The gene therapy works by prompting nearby cells to produce an enzyme – chondroitinase – which breaks down components of the scar.

For the first time, the team used a switch that can stop or start the gene therapy on-demand, using a common antibiotic. “This means we can hone in on the optimal amount of time needed for recovery,” said Professor Elizabeth Bradbury, from the Institute of Psychiatry, Psychology and Neuroscience.

Before trialling in humans, the team will look at why small amounts of the gene remained active even when switched off.

Published online at: www.europepmc.org, 14 June 2018.
Dr Oluwafemi Akande, a Postdoc Fellow of the Africa Research Excellence Fund, began his career in a field far removed from global health research. But by combining his knowledge of building design with his interest in public health, he’s hoping to realise his passion of improving people’s wellbeing.

I began my career as a student of architecture. But when I finished my studies, a lecturer mentioned to me about a potential career in research and this sparked my interest. Hoping to pursue this path, I started attending all the lectures I could. This is where I first identified a relationship between our built environment – the buildings where people work and live – and wellbeing.

I became intrigued by outbreaks of infectious diseases, for instance the meningitis outbreaks in my home country of Nigeria. I was interested to find out if there were any links between the spread of contagious diseases and the design of peoples’ homes. Most Nigerian buildings are based on the design of buildings in developed countries, without adapting them to the needs of an African country. The result is over-heated homes with poor levels of natural ventilation.

Poor ventilation and low air quality could be contributing to respiratory problems and infectious diseases spreading more rapidly. Plus, because homes are so hot, people often sleep outside exposing themselves to diseases spread by insects, like malaria.

My research is focused on understanding the links between building design and infectious diseases, and finding out how health could be improved by new approaches to architecture. After presenting some early findings at a conference in London, I won a PhD studentship in the UK.

My PhD was more focused on the energy efficiency of buildings. I saw the potential to learn the techniques I
needed to pursue the research I wanted to carry out in Africa. So when I returned to Nigeria, I was committed to staying in Africa and using my new knowledge to follow my passion to improve health.

That’s why I was so excited when I saw the Africa Research Excellence Fund (AREF) opportunity of a fellowship. I applied for an AREF Research Development Fellowship in 2016 and spent nine months working with Professor Catherine Noakes at the University of Leeds.

Catherine's research matches mine exactly. She’s an engineer with expertise in ventilation, airborne infection risk and engineering methods of control. Catherine uses bioaerosol experiments (using biological airborne particles) and computational modelling to assess risk and design new engineering solutions.

I’ve learned a whole range of new techniques to study airborne pathogens, indoor airflows and engineering solutions for controlling airborne disease transmission. I’m learning how to take a combined approach, with social scientists and environmental engineering researchers, to solve critical health problems that transcend the boundary of epidemiology and medicine.

My day-to-day activities consist of going out to observe practical problems in the built environment. I make use of every opportunity to visit buildings – for private, social or academic purposes! I also look out for factors that make a building healthy, comfortable and less expensive to own and live in. I then look at how to find the most practical and economical solutions to solve the problems.

The skills I consider to be most valuable are having a tenacious capacity to hold onto pursuing your passion. I’m passionate about using my experiences to inspire more junior scientists to stay in research. By helping the next generation and passing on tips and advice, the work AREF does can reach even more talented researchers.

Ultimately, working together is how we’ll build capacity in African health research and be able to improve healthcare and save lives across the continent.

The AREF is a UK registered charity working to enable more African medical researchers to reach their full leadership potential: www.africaresearchexcellencefund.org.uk

It was established by the MRC’s independent charity, the Medical Research Foundation: www.medicalresearchfoundation.org.uk

To learn how you can support their work, contact: Maria.andrews@aref-africa.org.uk
The MRC was one of the first organisations to sign up to the AllTrials campaign which is now supported by almost 800 organisations worldwide. AllTrials is the global campaign for all clinical trials to be registered and their results reported.

With backing from organisations like the MRC we have been able to put clinical trial transparency on agendas at the highest levels including the World Health Organisation, the UN, national governments and the European Parliament.

New laws mandating transparency have been written and serious discussions have started in research organisations and professional societies about new rules they should adopt to support more transparency.

A public commitment to transparency

So what can funders like the MRC do to help their researchers comply with these new rules? The obligations on researchers to register and report trials are moral, ethical, professional and legal. To help their funded researchers understand what they have to do, funders should have a policy and a public commitment to compliance with these obligations. Most don’t. But the MRC does.
In May 2017 the WHO released a statement on clinical research funders’ policies to urge the majority to do better. The statement committed signatories to writing and implementing a policy to ensure all clinical trials they fund are registered, all results from them are reported and to devising a way to monitor compliance with this policy. Twenty-one funders from around the world have now signed up. The MRC was one of the very first to sign up.

One year on, AllTrials is going to review the policies of the 14 funders who joined last May to check if they have kept their commitments. Given that the MRC’s existing policy already commits researchers to register and report funded clinical trials, we’re sure the MRC will again be one of the organisations leading the way.

Going further

Things are continually changing though. The National Institutes of Health (NIH) – the largest funder of medical research in the world – won’t grant funds unless it can verify that the applicant registers and reports their trials. Researchers’ past reporting performance is now going to impact whether they get funding for new trials. This is a first for clinical trial funders and it has the potential to make a massive difference in getting more old trials reported.

The NIH is by far the largest non-commercial funder of clinical trials in the world and so when it changes, it changes the baseline for what a funder could do. We hope it will show organisations who are already doing well – like the MRC – that there is still further they can go. However, right now, the MRC is showing us all how to absorb the new rules on clinical trial transparency into the way it works, and will help its researchers do that too.

The obligations on researchers to register and report trials are moral, ethical, professional and legal.

“Blazing the trial

We know the MRC’s policy is among the strongest in the world. An audit of the 18 largest global philanthropic and public funders found only two have a policy that hits the gold standard. The MRC was one of these.

The MRC’s policy requires researchers to register trials, report summary results from trials and be prepared to share the underlying data. And they support researchers with the costs of doing this.

Sense about Science is the UK charity that campaigns on the use and misuse of evidence in public life and launched the AllTrials campaign for clinical trial transparency in 2013: www.alltrials.net

- Recent MRC initiatives in data-sharing from clinical trials: mrc.io/sharing-clinical-trials-data
- The MRC policy and recent MRC review of clinical trials transparency: mrc.ukri.org/research/policies-and-guidance-for-researchers
How secure data sharing can help us treat dementia

Dementias Platform UK is a world-leading digital treasure trove, holding health data from millions of people, to help understand and treat dementia. Their one-stop shop gives researchers access to health data for dementia research and recognises contributions from researchers across the pay grade. Director Professor John Gallacher explains why it's good for science and scientists.

In the UK, we’re fortunate to have a growing, rich resource of data from people that take part in studies which follow their health and lifestyle choices over time, known as cohort studies.

But there isn’t a single standardised way of storing and analysing this information. Without the right tools to search, interrogate and analyse this information, the data can seem impenetrable.

At Dementias Platform UK (DPUK) we have a solution – a place for researchers to access all the data they need to answer some of the toughest questions about dementia. We want the best minds to access the best data, regardless of their location.

We focus on bringing scientists to the data so they don’t have to hunt for what they need or navigate the transfer of large and sensitive datasets to collaborators or colleagues. By bringing data from multiple cohort studies together into a secure, structured, robust – and fully-auditable – environment we make it easier for scientists to access, understand and analyse information that could hold the key to understanding dementia.

Pushing science forward

Despite the growing number of large-scale cohort studies, such as UK Biobank and Million Women, most UK cohort studies are too small to answer many of the emerging research questions for dementia on their own. That’s why we’ve developed data discovery and analysis tools within our system, to make it easier to pool and compare data from existing studies.

This is particularly important for dementia as we know it can develop 10 years before any signs or symptoms occur. We can use data pooled from multiple cohorts to identify any early changes in health, to develop treatments that delay the progression of the disease.

Making research life easier

We want to make life easier for researchers who collect data, as well as researchers who analyse data.

For the cohort research teams, we offer a service that manages access to data on their behalf. This makes life easier for the cohort research team as they don’t have to
make repeated data transfers in response to access requests. But they do approve all data access requests, and so keep control of their data.

By bringing cohort data into one place, we can organise the data into a common format. This makes life easier for the analyst, who can access multiple datasets using a common set of conventions. Of course, researchers can apply for access to the original or curated datasets.

Rewarding contributions

Collecting this data isn’t an easy job and involves lots of people at all stages, from different disciplines. This makes it difficult for early career researchers, support scientists and infrastructure operators to receive due credit. It can also make it harder for those reading the research to understand where the data came from. Most of all we risk undervaluing the role of the cohort research teams who collect the data in the first place.

At DPUK we address this issue at two levels. First, whenever someone applies to a cohort team to access data, the cohort team is automatically considered an official collaborator. It can be represented in the author line of any research papers.

Second, for publications that involve use of our data portal, we will ‘badge’ the contribution of everyone in the team behind the article. We do this using the CRediT taxonomy. The issue of credit attribution is an ongoing debate and there is still much to do. For example, unless search engines cover the acknowledgements line, wider contributions remain virtually invisible.

The future

I think the type of data storage and management systems that we’ve developed will play an increasingly important role as datasets become larger, more complex and more sensitive. Scientists will require ever simpler and more convenient access to data. And funders will want reassurance that data are being used fully and responsibly.

There are technical challenges, including developing more sophisticated and intuitive data discovery and visualisation tools. We also need a change in culture, weaning analysts off the expectation that large and sensitive datasets should be downloadable to desktop computers.

Big data has brought us all to the beginning of change. It’s a culture change, which isn’t necessarily easy, but the rewards far outweigh the challenges. We hope DPUK will help more researchers access valuable data, leading to a greater understanding of dementia and the promise of effective treatments.
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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