Industrial strength research
Uniting funding and knowledge to beat disease
Page 8

Access for all
Dr Richard Smith says the future’s bright for Open Access publishing
Page 14
The MRC is world-renowned for supporting an unrivalled collection of population and patient cohorts. Cohort studies provide vital resources for studying human health and disease; over the years they have given us unique insight into diseases, shaped healthcare policy and shown how environment and circumstances can affect our health.

It is exciting that UK Biobank, supported by a consortium of funders led by the MRC and the Wellcome Trust, will soon open up to scientists its collection of data and samples from half a million volunteers. Immense impact is to be expected.

On page 8 of this issue of Network, you can read about an MRC/Association of British Pharmaceutical Industries initiative which is bringing together scientists from academia and industry to find new treatments for inflammatory disease. MRC-supported patient cohort studies will play a pivotal role in this research, with scientists sharing access to cohort study data and samples.

Well defined, disease-focused cohorts are attractive to pharmaceutical and biotechnology companies which are looking to carry out early, exploratory trials of potential new drugs, or new treatment mechanisms and pathways. They make recruitment to clinical trials quicker, and they are also essential for stratified medicine research in which treatments are tailored to patients of a particular phenotype.

Thanks to investment in this area by the MRC and our partners in government, academia and industry we can look forward to seeing many more discoveries emerging from cohort studies over the coming decades.

Sir John Savill
NEWS

Gambian unit wins Gates’ grant

The MRC’s research unit in The Gambia has secured a $6.9 million (£4.26m) award from The Bill & Melinda Gates Foundation for a project to find out whether new vaccines could help prevent thousands of childhood deaths from pneumococcal disease.

Pneumococcal disease is a leading cause of serious illness in children and adults across the world. The disease is caused by a common bacterium, pneumococcus, which can attack different parts of the body, causing pneumonia, bacteraemia and meningitis. The disease accounts for 826,000 child deaths each year.

The goal of the Gates project is to facilitate the introduction and maintenance of pneumococcal conjugate vaccines (PCVs) in African countries – vaccines that can protect children against pneumococcal disease. PCVs are expensive and their use in low and middle-income countries has to be based on cost effectiveness as well as medical effectiveness. The Gambian immunisation programme already includes these PCVs, so by analysing how well it works there, the research team hopes to equip decision-makers in other African countries with the evidence they need to introduce PCVs into their own immunisation programmes.

Dr Grant Mackenzie, lead researcher on the project at MRC Unit The Gambia, explained: “This study will provide unique data on the impact, both direct and indirect, and on the costs of introducing PCVs into routine use in a low-income country. Other low-income countries will use our data to assist their decisions whether to introduce and maintain PCVs in their own schedules. We hope that good data, supporting policy, will ultimately lead to saving children’s lives.”

Professor Brian Greenwood, former director of the unit and now a member of its Scientific Advisory Board, commented: “The unit has a strong track record of work on PCVs. It carried out some of the earliest trials of PCVs in the developing world which were key in leading the World Health Organization to recommend PCVs for routine use in countries with high child mortality, and in the establishment of the Advanced Market Commitment which is providing the funds to make this possible. The unit has a lot to be proud of!”

The project will build capacity within the Gambian health service by training medical, clinical support, nursing and technical staff, as well as providing and maintaining facilities and equipment.

Benefits of non-human primate research reviewed

An independent review of research using non-human primates has concluded that such work should continue and that research projects are generally of a high standard. However, it also questioned whether the ten per cent of projects where no clear scientific, medical or social benefits had emerged could be further reduced.

The review was commissioned by the MRC, the Biotechnology and Biological Sciences Research Council and the Wellcome Trust, prompted by the recommendation of a 2006 Working Group chaired by Sir David Weatherall.

The review looked at the strengths, weaknesses and quality as well as impacts and outcomes of such research with a view to informing the three organisations’ future science and funding strategies. It will also feed outcomes into any Government strategy on non-human primate use.

Sir John Savill commented: “We have a track record of ensuring the results of our research are translated into patient and public benefit. We realise this responsibility is particularly important when research uses animals. Benefits have emerged from the majority of the studies analysed in the Bateson review and we would anticipate more in the fullness of time. This reflects the lengthy nature of scientific enquiry, which requires time between the completion of research and tangible rewards to become obvious.”

Drug trial gives hope for muscular dystrophy patients

A new treatment for Duchenne Muscular Dystrophy (DMD), a devastating inherited muscle-wasting disease, has shown promise in a clinical trial co-funded by the MRC and biotech company AVI BioPharma.

The gene-based treatment called AVI-4658 proved effective in raising levels of dystrophin, a key muscle protein which is faulty in DMD sufferers, in seven out of 19 trial participants (aged five to 15 years.)

DMD affects around one in 3,500 boys worldwide. It is caused by a mutation in the gene which codes for dystrophin, an important structural protein in muscle fibres which acts like a shock absorber to protect the muscle from damage. Boys with DMD have faulty dystrophin, so over time their muscle tissue weakens and breaks down. Muscle strength throughout the body is gradually lost leading to a shortened lifespan.

AVI-4658 works by blocking a section of mutated DNA involved in around 13 per cent cases of DMD. The scientists suggest that the treatment tested in this trial could be used to treat some boys with DMD. Overall, this approach, known as 'exon skipping' could work for at least 70 per cent of sufferers if it were developed to block the other mutations in the dystrophin gene which can cause DMD.

The research was led by scientists at the UCL Institute of Child Health and the MRC Centre for Neuromuscular Diseases in Newcastle and London and funded by AVI BioPharma, which makes AVI-4658, with co-funding from an MRC Translational Research Grant. The research was conducted by the MDEX Consortium, which is chaired by Professor Francesco Muntoni, and results were published in The Lancet in July.

Professor Muntoni said: "I've worked with patients with DMD for many years and this is the first time we can say with confidence that we've made a significant breakthrough towards finding a targeted treatment. If our strategy shows continued success, this therapy could substantially reduce muscle damage in affected boys with DMD, and improve the quality of life for DMD patients, their mobility and the way their condition is managed as they get older."

Major funders to launch open access journal

The Howard Hughes Medical Institute, the Max Planck Society and the Wellcome Trust have announced that they are to support a new, top-tier, open access journal for biomedical and life sciences research.

The journal will be edited by Dr Randy Schekman, a distinguished cell biologist and former editor of Proceedings of the National Academy of Sciences, who is in the process of recruiting an editorial team. "It is my strong feeling that there is a need for a scientific journal at the very high end that is run by active practising scientists embedded in an academic environment; individuals who experience both the frustrations and satisfactions of research," explained Dr Schekman.

In this issue of Network, former BMJ editor Dr Richard Smith says this heralds a long overdue move towards open access publishing (see Opinion, page 14).

Teenage girls aren’t eating their greens

A national survey has shown that teenage girls are eating only half the amount of fruit and vegetables recommended by the government, and teenage boys aren’t doing much better.

The 2008 to 2010 results from the National Diet and Nutrition Survey show that on average girls ate only 2.7 portions of fruit and vegetables per day, half a portion less each day than boys. The survey also showed that only 56 per cent of teenage girls are getting enough iron in their diet, possibly as a result of excluding meat. Teenagers of both sexes failed to eat five portions of fruit and vegetables per day, with only 13 per cent of boys and just seven per cent of girls meeting the recommendation.

Data collected on adults show more encouraging eating habits. While only one third are eating their ‘five-a-day’, a higher proportion than in the previous survey were only a little under the target: on average the intake among 19 to 64 year olds was 4.2 portions per day, and in the over-65s it was 4.4 portions.

The National Diet and Nutrition Survey (NDNS) is a rolling survey carried out by MRC Human Nutrition Research, the National Centre for Social Research and University College London and funded by the Department of Health and the Food Standards Agency. Through interviews, food diaries and blood and urine samples it gathers information on the dietary habits and nutritional status of a representative sample of 1,000 people from the UK population each year.
An unusual take on sexual health education was on offer at the Green Man music festival in the Brecon Beacons this August, thanks to two scientists from the MRC Centre for Reproductive Health.

Festival-goers raced sperm toys through a model of the female reproductive tract to reach the ultimate goal – the egg – learning about the science behind sex and reproductive health along the way. The interactive display, called The Egg and Sperm Race, was devised by PhD students Vicky Young and Gemma Sharp (who recently won £500 towards the activity in a public engagement competition – see below). The aim of the display is to put across important issues on sexual health to 16 to 30 year olds.

Gemma explained: “Sexual health is important, but we didn’t want to seem like we were preaching. People seemed genuinely interested and we had brilliant feedback. Some of our key messages had to be adapted slightly for younger children, but they still absolutely loved the racing game. The stall was one of the most popular in Einstein’s Garden.”

Development and costs of the event were supported by an MRC public engagement award. MRC scientists interested in running their own events should contact their regional communications manager.

See www.eggandspermrace.com for more information.

Egg and Sperm Race at the Green Man Festival

MRC student wins ‘science X Factor’

Gemma Sharp, a first year PhD student from the new MRC Centre for Reproductive Health in Edinburgh, has been voted winner of a public engagement activity designed to get secondary school students thinking and talking about science.

-supported by the Welcome Trust, I’m a Scientist, Get Me Out of Here! invites school students to chat to scientists and ask them questions via an online forum for two weeks in June and then vote for their favourite. Each day, scientists with the fewest votes are evicted in an X Factor-style competition. The activity involved 100 scientists from across the UK, who competed for a prize of £500 to spend on their own public engagement activities.

Reflecting on her experience, Gemma remarked: “This has been a rollercoaster master class in communicating science, scary at times but I’m so pleased to have won. This has been an amazing chance to connect with young people and find out how they view science: it’s been both inspiring and energising.”

For more information, visit: http://imascientist.org.uk

MRC Open Council goes to Wales

Cardiff was the setting for this year’s MRC Open Council meeting in July - an annual event that gives local and regional stakeholders the opportunity to meet and put questions to the members of the MRC’s Council.

Around 80 guests attended from organisations from both sides of the Severn. Faculty researchers and the deans of Medical Schools at the Universities of Swansea, Bristol and Cardiff rubbed shoulders with NHS executives, representatives from the Welsh Government and MRC grant-holders.

To coincide with the event, the Welsh Government announced funding of more than £7 million to better understand major diseases and develop new treatments for conditions including cancer and mental illness.

Lesley Griffiths, Welsh Assembly Minister for Health and Social Services, said: “We’re pleased to welcome the MRC to Wales to inform them of our plans and priorities for health research and highlight the NHS in Wales’ role as a platform for essential clinical trials and research.”

To read a full summary of the meeting go to http://bit.ly/onFae2

Mind Over Matter: an exhibition

A revolutionary photographic exhibition about people who have donated their brains for MRC-funded dementia research will go on display in London next month.

Mind Over Matter will feature photographs and footage of brain donors including participants in the Cognitive Function and Ageing Study (CFAS), a population-based study investigating health and cognitive decline in older adults. The CFAS tissue banks are part of the UK Brain Banks Network which receives underpinning support from the MRC.

Co-creator Dr Bronwyn Parry of Queen Mary, University of London, says: “Visual representation of organ donors is unprecedented in the UK. Through Mind Over Matter, we hope to challenge the historical relationship between anonymity, objectivity and the impartiality of science.”

The exhibition is supported by a Wellcome Trust People Award and runs from 11 to 23 October at Shoreditch Town Hall, London, E14 9LT. There is also a public talk at The Science Museum’s Dana Centre on 6 October (7-9pm). For more information visit www.mindovermatterproject.co.uk

MRC student wins ‘science X Factor’
Measuring success

The latest findings from MRC e-Val, the MRC’s online data gathering tool which tracks the impacts and outcomes of MRC-funded research, are now available online.

The efforts of scientists to update e-Val each year equips the MRC with an invaluable cache of information on the impact of MRC research. It allows us to measure progress with our strategic plan and to continue to strengthen the case for investment in medical research.

To read the latest findings, visit: http://bit.ly/oL7UGe

Success for human tissue legislation e-learning module

Over 3,000 people so far have completed the MRC Regulatory Support Centre’s (RSC) e-learning module, which provides training for all who use human tissue in research.

Developed following successful face-to-face training, the module was launched last April and, using real life examples, it teaches scientists all they need to know about human tissue legislation in the UK. It is freely available, practical and interactive. The module, which lasts just 45 minutes, is followed by a short quiz to test knowledge. Users can print a certificate after successful completion.

In coming years the RSC will continue to widen access to regulatory training by further developing its e-learning portfolio. To access the Human Tissue e-learning visit: http://bit.ly/ozv0aJ

Science policy opportunities for PhD students

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

The scheme is open to all MRC-funded PhD students (based in a university, unit or institute) in their third and fourth year of study, including clinicians undertaking a PhD as part of their MRC Clinical Research Training Award.

Interns will get first-hand experience of the medical science policy environment, gaining insight into how research, and the way in which it is communicated, can impact on policy. The internship also provides the opportunity to help build valuable networks with the UK’s most eminent medical scientists and key science and health stakeholders.

The internships will be based at the Academy’s offices in central London and supported by a three-month extension to students’ PhD maintenance stipend. All eligible candidates will be assessed through a competitive application process. Students must have their supervisor’s support to be eligible to apply.

Applications will be welcomed from 12 September until 31 October 2011. Interviews will take place in the week beginning 17 November 2011. Applications should be sent to catherine.luckin@acmedsci.ac.uk

For more information go to: http://bit.ly/nftLYP

For details of the application process visit: www.acmedsci.ac.uk/p182.html

NC3Rs fellowships

Competition is open for the National Centre for the Replacement, Refinement and Reduction of the use of animals in Research (NC3Rs) David Sainsbury Fellowships. The deadline is 30 November 2011 and interviews will be held in April 2012 (dates to be confirmed).

MRC Research Board and Panel recruitment 2011

During September 2011 the MRC will be advertising for 53 new members to serve from 1 April 2012 on ten of its boards and funding panels. For further details, including a full list of vacancies and the applications process, visit: http://bit.ly/qqnPiv

The closing date for applications is 3 October 2011.

£15m call to establish e-health research centres

Ten funding partners, led by the MRC, have launched a £15m call to support new centres of excellence which will undertake research linking e-health records with research data and routinely collected datasets. The aim is to build and sustain a vibrant e-health informatics research capability in the UK.

For more information visit http://bit.ly/nbJNLu
## OPPORTUNITIES

### BOARD

<table>
<thead>
<tr>
<th>Board and Programme</th>
<th>Deadline date</th>
<th>Board meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections and Immunity Board</td>
<td>7 September 2011</td>
<td>15 - 16 February 2012</td>
</tr>
<tr>
<td>Population and Systems Medicine Board</td>
<td>14 September 2011</td>
<td>29 February - 1 March 2012</td>
</tr>
<tr>
<td>Neuroscience and Mental Health Board</td>
<td>28 September 2011</td>
<td>15 - 16 March 2012</td>
</tr>
<tr>
<td>Molecular and Cellular Medicine Board Programme &amp; Partnership Grant (outline)</td>
<td>9 November 2011</td>
<td>8 - 9 February 2012</td>
</tr>
<tr>
<td>Infection and Immunity Board Programme &amp; Partnership Grant (outline)</td>
<td>9 November 2011</td>
<td>15 – 16 February 2012</td>
</tr>
<tr>
<td>Population and Systems Medicine Programme &amp; Partnership Grant (outline)</td>
<td>7 December 2011</td>
<td>29 February - 1 March 2012</td>
</tr>
<tr>
<td>Neuroscience and Mental Health Board Programme &amp; Partnership Grant (outline)</td>
<td>7 December 2011</td>
<td>15 - 16 March 2012</td>
</tr>
</tbody>
</table>

### RESEARCH PROGRAMMES

<table>
<thead>
<tr>
<th>Programme</th>
<th>Deadline date</th>
<th>Panel meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology Research Panel</td>
<td>5 October 2011</td>
<td>6 – 7 March 2012</td>
</tr>
<tr>
<td>Developmental Pathway Funding Scheme</td>
<td>3 November 2011</td>
<td>19 - 20 January 2012</td>
</tr>
<tr>
<td>Translational Stem Cell Research (full)</td>
<td>30 November 2011</td>
<td>22 February 2012</td>
</tr>
</tbody>
</table>

### STUDENTSHIPS AND FELLOWSHIPS

<table>
<thead>
<tr>
<th>Fellowship</th>
<th>Deadline date</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Research Training Fellowship</td>
<td>15 September 2011</td>
<td>29 February - 2 March 2012</td>
</tr>
<tr>
<td>Population Health Scientist Fellowship</td>
<td>22 September 2011</td>
<td>14 – 16 March 2012</td>
</tr>
<tr>
<td>Special Research Training Fellowship in Biomedical Informatics</td>
<td>6 October 2011</td>
<td>14 – 16 March 2012</td>
</tr>
<tr>
<td>Early Career Fellowship in Economics of Health</td>
<td>6 October 2011</td>
<td>14 – 16 March 2012</td>
</tr>
<tr>
<td>Methodology Research Fellowship</td>
<td>6 October 2011</td>
<td>14 – 16 March 2012</td>
</tr>
<tr>
<td>Career Development Award in Biostatistics</td>
<td>6 October 2011</td>
<td>14 – 16 March 2012</td>
</tr>
<tr>
<td>National Centre for the Replacement, Refinement and Reduction of the use of animals in Research (NC3Rs) David Sainsbury Fellowship</td>
<td>30 November 2011</td>
<td>Mid-April 2012 (tbc)</td>
</tr>
</tbody>
</table>

### CALLS FOR PROPOSALS

<table>
<thead>
<tr>
<th>Call</th>
<th>Expressions of interest</th>
<th>Deadline date</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Health Informatics Research Centres Call</td>
<td>6 September 2011</td>
<td>1 November 2011</td>
</tr>
<tr>
<td>African Research Leaders scheme</td>
<td>30 September 2011</td>
<td>3 November 2011</td>
</tr>
</tbody>
</table>

For updates, please check: [www.mrc.ac.uk/fundingopportunities](http://www.mrc.ac.uk/fundingopportunities)
Working closely with industry, the MRC has recently invested over £10 million in inflammatory and immune disorder research designed to bring treatments to patients as quickly as possible. *Network* found out more.

**INDUSTRIAL STRENGTH RESEARCH**

Turning scientific discoveries into new treatments and diagnostics is a central tenet of the MRC’s mission, as is improving economic competitiveness. This is why partnership with the life sciences industry is essential. A symbiotic approach to healthcare is vital to ensuring the speedy delivery of new drugs, treatments and biomarkers that can ultimately be tailored to individual patient needs.

### Creating consortia

As part of this drive, the MRC has been working alongside the Association of British Pharmaceutical Industries (ABPI) to promote academic-industrial collaborations.

In 2009, the MRC and ABPI hosted a series of workshops with industry and university leaders in the field of respiratory disease and inflammatory joint disease, with the aim of identifying research priorities that had the potential to have the greatest impact on patients in the short-to-medium term.

The workshops successfully enabled the creation of two consortia focusing on chronic obstructive pulmonary disease (COPD) and rheumatoid arthritis (see opposite), with an MRC investment of £10.5m. So far, 17 institutions, two biotechnology companies and 15 pharmaceutical companies - including big names like AstraZeneca and GlaxoSmithKline - have got involved.

### Unique partnerships

Industry partners bring to the table a wide range of invaluable skills and information as Dr Des Walsh, MRC research programme manager, explained: “Our colleagues in industry have helped to plan and manage both consortia and we are sharing a huge amount of knowledge including data, cohorts, tissues, compounds and people. This will ensure pre-competitive research is open and shared across academia and companies alike. The research is to give a holistic view of disease and will contribute to MRC’s work in stratified medicine - by identifying the right patients, the chance of new treatments working is increased.”

Dr Paul Whittaker is director of the Novartis Institutes for Biomedical Research Respiratory Disease Area and industry lead for one of the COPD consortium work packages. He commented: “We welcome this opportunity to work together and create a step-change in our understanding of the pathological processes underlying COPD and improve the well-being of patients suffering from this disease. Sharing and comparing data across industry, academia and government are crucial ingredients for the successful development of effective therapies for COPD.

“The use of well phenotyped patient cohorts, including those funded by the MRC, is a key part of this initiative and will allow the stratification of patients both with respect to disease and likely therapeutic response. We are grateful for the selfless efforts of the patients who participate in these studies and make them possible.”

### Future directions

It is hoped that the consortia’s future accomplishments will draw in more research projects; thereby allowing pharmaceutical, biotechnology, diagnostics and devices companies to join the consortia as they develop. Both consortia are governed by management groups comprising academic and industry representatives and progress is regularly reviewed against agreed milestones.

Des added: “This is the first time the MRC has taken this approach to funding larger partnerships with industry and results so far indicate that it has been welcomed by both the academic and life science industry sectors. The next disease areas we plan to focus on using this model are diabetes and metabolic diseases.”

To find out more about the consortia, contact Des Walsh (desmond.walsh@headoffice.mrc.ac.uk)

“*By identifying the right patients, the chance of new treatments working is increased*”
Consortium 1: Fighting respiratory disease

Chronic obstructive pulmonary disease (COPD), formerly known as chronic bronchitis and emphysema, is most commonly caused by smoking. It leads to damaged and inflamed airways, which makes it harder to breathe. The healthcare cost to the UK of COPD is estimated to be £1 billion per year. The World Health Organization forecasts that by 2030 it will be the fourth leading cause of death in the world.

The COPD consortium is investigating disease progression by sharing data and samples from a network of patient cohorts. As part of this consortium, the University of Leicester’s Professor Chris Brightling is leading research to gain a deeper understanding of COPD patients and their symptoms. He explains: “The pharmaceutical industry has been relatively unsuccessful at bringing new treatments to the market for COPD. Many products fail when they are first given to patients because not all COPD sufferers are the same, and drugs will only treat certain aspects of the disease.

“Therefore, we are working on determining what makes COPD patients different from each other, to increase our understanding of which types of drugs will benefit which types of people.”

Professor Peter Barnes, head of respiratory medicine at Imperial College London, is exploring the differences in the immune system of COPD patients that leave them open to an increased risk of ‘flare-ups’ – where symptoms suddenly get worse. Peter says: “COPD patients have bacteria in their lungs, whereas the lungs of smokers without COPD and non-smokers are sterile. We have evidence that in COPD patients, immune system cells called macrophages and neutrophils, which defend the lungs, are not clearing bacteria as they normally do.

“We think this is down to abnormal functioning of the cells and have identified some of the mechanisms which have gone wrong. We now hope to find treatments that can restore normal macrophage and neutrophil function, allowing them to sterilise the lung, reduce flare-ups and halt worsening of the disease.”

Other work is focusing on identifying new disease mechanisms as drug targets or biomarkers; and investigating the mechanisms underlying the muscle wasting associated with COPD to maintain patients’ ability to get out and about for as long as possible.

Consortium 2: Unravelling rheumatoid arthritis

Rheumatoid arthritis (RA), the focus of the second consortium, is an autoimmune disease that causes painful inflammation in the joints. It’s the second most common form of arthritis in the UK, affecting around 400,000 people.

The RA consortium is setting up a new longitudinal study of patients with early-stage RA, which will observe their disease progression and response to treatment very closely. This will be coupled to developing an ‘immune toolkit’ to spot the immunological changes that take place as early disease develops into more chronic rheumatoid arthritis.

Professor John Isaacs from Newcastle University, who is leading the development of the toolkit, explains: “We will take patient blood samples and subject them to a battery of lab tests, slowly homing in on those that allow us to measure what’s happening in the immune systems of RA patients. This will help us to better understand the disease and predict whether a patient’s RA is likely to ‘switch off’ and enter remission with therapy or to persist and damage their joints.

“Importantly it should also help us to tailor a patient’s treatment and to develop better drugs. An exciting possibility is that this work could potentially be relevant to other diseases like diabetes, multiple sclerosis and asthma.”
Six distinguished MRC scientists have been recognised with medals, awards and prize lectures by the Royal Society this year.

Sir Greg Winter, from the MRC Laboratory of Molecular Biology (LMB), has been awarded a Royal Medal for his pioneering work in protein engineering, for developing technologies to make therapeutic monoclonal antibodies, and for his contributions to society as an inventor and entrepreneur. Sir Greg was deputy director of the LMB from 2006 to June 2011. His research has led to the development of antibody treatments for diseases such as cancer and rheumatoid arthritis, and he has founded three biotechnology companies, including Cambridge Antibody Technology, now part of AstraZeneca.

A Royal Medal was also awarded to Dr Robin Holliday, formerly head of the Division of Genetics at the MRC National Institute for Medical Research. Robin has been singled out for his influential discoveries of the ‘Holliday junction’ molecular structure (formed whenever the breakage and rejoining of DNA occurs in chromosomes) and the function of DNA methylation, a process vital for normal human development, in which DNA is chemically modified. During his career he made proposals which became of central importance to the field of epigenetics, the study of altering gene expression without changing the genetic code.

Professor Francesca Happé, Professor of Cognitive Neuroscience at the MRC Social, Genetic and Developmental Psychiatry Centre at the Institute of Psychiatry, King’s College London, has been awarded the Rosalind Franklin Award. Francesca is recognised for her scientific achievements and her work to promote women in the fields of science, technology, engineering and medicine. Her research interests centre on autism and Asperger syndrome, and she has written a book on autism for non-specialist readers.

Dr Tim Bliss, formerly head of the Division of Neurophysiology at the MRC National Institute for Medical Research, is to deliver the Royal Society’s annual Croonian Lecture in 2012. A world-renowned expert in the physiology of memory, Tim joined the staff of the NIMR in 1968. He published the first detailed account of long-term potentiation, one of the major cellular processes underlying learning and memory, in 1973.

Dr Brad Amos, emeritus group leader from the LMB’s Structural Studies Division, has been invited to deliver the 2012 Leeuwenhoek Lecture. This is in recognition of his exceptional impact on the fields of cellular and developmental biology and neurobiology, as well as other branches of science, through his co-development of the laser scanning confocal microscope.

From the same division of the LMB, Dr Sarah Teichmann has been invited to deliver the 2012 Francis Crick Lecture in recognition of her achievements relating to decoding the principles of how proteins interact with one another. She has made seminal contributions to the fields of genomics and evolution by studying how individual proteins and families of proteins combine to produce larger complexes with different functions.
Three new research board leaders appointed

Three new research board chairs have been appointed by the MRC’s Council. The trio will take up their positions from 1 April 2012 and will serve until the end of March 2014.

**Professor Hugh Perry** is to chair the Neuroscience and Mental Health Board, taking over from Professor Chris Kennard. Hugh is Professor of Experimental Neuropathology at the University of Southampton where he studies the contribution of inflammation to neurological and neurodegenerative diseases. He is also a Fellow of the Academy of Medical Sciences and a member of the Nuffield Council on Bioethics.

The Molecular and Cellular Medicine Board (MCMB) will be chaired by **Stephen Hill**, Professor of Molecular Pharmacology at the University of Nottingham, who replaces Professor Paul Luzio. Stephen is a Fellow of the British Pharmacological Society and was a member of the MCMB from 2006 and the board’s deputy chair from 2008 to 2011. His research interests include studying how proteins in the cell membrane, G protein-coupled receptors, interact with drugs at the molecular level.

**Professor David Lomas** is to chair the Population and Systems Medicine Board, stepping into the shoes of Professor Stephen Holgate. David is Professor of Respiratory Biology at the University of Cambridge and previously served on the MRC’s Physiological Systems and Clinical Sciences Board (now disbanded). He is a Fellow of the Academy of Medical Sciences and Honorary Consultant Physician at Addenbrooke’s and Papworth Hospitals. His area of expertise lies in a collection of diseases called serpinopathies, examples of which include liver cirrhosis and dementia.

Brain development research wins UCL prize

Dr Rita Sousa-Nunes of the MRC National Institute for Medical Research (NIMR) has become one of the first two recipients of the UCL Neuroscience Early Career Prize.

Her paper, published in *Nature*, won in the senior post-doc category. Rita received £500 and was invited to speak about her research at the UCL Neuroscience Symposium 2011 in July. Rita is in Dr Alex Gould’s research group at NIMR which uses the fruit fly, *Drosophila*, to study the genetics of growth and metabolism.

Rita’s paper explores how dietary protein helps the developing brain to grow, by signalling to ‘paused’ neural stem cells to get them to resume division. For mammals like ourselves, this highlights the importance of maternal nutrition during fetal development (see May/June *Network*, page 15).
Small-scale badger culling raises bovine TB risk

Over the last decade, the slaughter of cattle infected with bovine tuberculosis (TB) is estimated to have cost the taxpayer around £500 million. Efforts to control the disease have been hampered by the persistence in the badger population of *Mycobacterium bovis*, the bacterium that causes bovine TB, and transmission of the disease between species. To tackle this problem, the government is considering licensing repeated widespread culls of badgers. Research from the MRC Centre for Outbreak Analysis and Modelling at Imperial College London, which analyses and models new infectious disease outbreaks in humans and animals, suggests that widespread culling may be more effective than small-scale or patchy culling in response to bovine TB outbreaks. It shows that localised culling actually appears to increase the risk of infection in nearby herds. The new analysis looked at data from a randomised culling trial carried out between 1998 and 2006. It found that reactive culling activity in the previous year within one kilometre of a herd more than doubled the risk of bovine TB, even after adjusting for the number of confirmed outbreaks in cattle nearby. The findings may be linked to the observation that badgers which survive the culling of their group wander over a larger area, increasing their contact with neighbouring cattle. Professor Christl Donnelly, who led the study, explained: “These findings add to the evidence that localised reactive badger culling has a detrimental effect on TB risk for cattle. This may explain why culls in the past were ineffective at reducing the incidence of bovine TB.”

Published online in *Biology Letters*, http://rsbl.royalsocietypublishing.org, 13 July 2011

Childhood inflammatory bowel disease on the rise

Cases of inflammatory bowel disease (IBD) in the under 16s in Scotland have increased by 76 per cent in just 13 years, new research shows. Scientists compared data on a cohort of Scottish children diagnosed with IBD between 1990 and 1995 with an MRC-funded cohort study of Scottish children diagnosed between 2003 and 2008. In the recent study, 436 children received an IBD diagnosis, compared with 260 in the earlier study. The research also showed that cases of childhood Crohn’s disease had increased five-fold in 34 years from the earliest study of 1969 to 1974. Professor David Wilson from the University of Edinburgh, who led the research, commented: “The reason for this dramatic and continued rise in cases of childhood IBD is not yet clear; however, future research on how the disease develops and other trends within the population might provide more insights. These findings really highlight the value of large cohort studies, and the MRC funding of our paediatric-onset IBD cohort and treatment study (PICTS) has been vital - the results are important for paediatric IBD epidemiological research worldwide, not just in Scotland.”

Published online ahead of print at www.ccf.org/ccfaprof/ibd-journal, June 2011

Drugs to fight asthma’s delayed attack

Around half of people with asthma experience a ‘late phase’ of symptoms up to eight hours after exposure to environmental allergens such as pollen or dust mites. This late phase causes further breathing difficulties which can last up to 24 hours. Until now, its cause has remained a mystery. But new MRC-funded research led by scientists from Imperial College London has found evidence that the late asthmatic response happens because allergens trigger sensory nerves in the airways, which respond to particles in the air. This leads to the release of a signalling molecule called acetylcholine from other nerves, which causes the airways to narrow. The research was carried out in mice and rats, but if the findings translate to humans it suggests a new role for anticholinergic drugs, which work by blocking acetylcholine. Lead scientist Professor Maria Belvisi, from the National Heart and Lung Institute at Imperial College London, explains: “Our study in animals suggests that anticholinergic drugs might help to alleviate these symptoms, and this is supported by the recent clinical data. We are now seeking funding to see if these findings are reproduced in proof of concept clinical studies in asthmatics.”

Published online ahead of print at http://thorax.bmj.com, August 2011
Alcohol damage study sheds light on rare disease

Scientists at the MRC Laboratory of Molecular Biology (LMB) have discovered that the damage caused to DNA by an excess of acetaldehyde, a by-product of the breakdown of alcohol in our bodies, is irreparable. In a secondary discovery, a two-tier defence system in cells has also been found that limits this threat of permanent genetic damage. Firstly, cells can produce specialised enzymes to break down and remove acetaldehyde. If this step fails, a second mechanism kicks in to repair the damaged DNA using another set of enzymes known as the Fanconi proteins. The research team studied pregnant mice which had been genetically altered to make them unable to produce either set of enzymes. When they were given the equivalent of a single binge drinking session of alcohol, catastrophic damage was caused to the fetus. Alcohol consumption also damaged blood stem cells in the adult mice, halting the production of blood. The research suggests that people with a rare disease called Fanconi’s anaemia, who lack these DNA repair enzymes, are likely to be especially sensitive to acetaldehyde. This could explain why these individuals are susceptible to blood disorders and cancer. Lead author of the study, Dr KJ Patel, commented: “This new knowledge transforms our view of precisely how excess alcohol causes damage - ultimately changing our DNA. Quite apart from this, our conclusions suggest potentially simple approaches to treat Fanconi’s anaemia – currently a terminal incurable illness in humans.”

Nature 475, pp53 – 58 (2011)
The recent announcement that a free, open access journal is to be launched next year heralds a long-awaited move towards open access publishing, says Dr Richard Smith, director of the Ovations Chronic Disease Initiative and former editor of the British Medical Journal.

Access for all

In the mid-1990s, when I was the editor of the British Medical Journal (BMJ) and chief executive of the BMJ Publishing Group, I spoke to the annual meeting of the Scientific, Technical and Medical Publishers in Frankfurt. I told them I was confident that eventually everybody would be able to access all scientific research for free. They thought I was mad.

Now, 15 years later, around 10 per cent of scientific studies are ‘gold open access’, meaning that all content is immediately available online for anyone to read and reproduce. There are now some 5,000 open access journals. Open access publishers BioMed Central and the Public Library of Science, on whose board I sit, have shown this model of publishing can be profitable. The Wellcome Trust, the Max Planck Society, and the Howard Hughes Medical Institute, all major funders of research, have announced the creation of an open access journal to rival Nature, Science and Cell: authors will not have to pay, but reviewers will be paid. Increasing numbers of funding bodies and universities are mandating that their research be open access — including the MRC.

Perhaps most crucially we have seen the launch of open access ‘mega-journals’ like PLoS One. Now publishing almost 1,000 studies a month, the PLoS One model has been copied by many other publishers, including Nature, the BMJ, the Royal Society and Cell Press. These journals peer review for rigour not impact. This makes a lot of sense because pre-publication peer review is poor at spotting ‘winners’. The journals also include post-publication mechanisms for assessing importance such as comprehensive article metrics. In the case of PLoS One this includes not just real-time data on the number of people accessing the article but also citations.
in four databases.

At this point I must define open access, as many confuse it with free access. Research papers that are open access are available free, but in addition the authors retain rights to attribution and no permission is required for re-use. The research can be downloaded, sent to anybody anywhere, and translated, and data can be mined and figures reproduced.

My certainty, back in the mid-1990s, that open access would become the norm was because the drivers are so strong. First of these is the sheer creative and intellectual power generated by everyone having open access to research. As Bernard Shaw pointed out, if two people exchange an apple they still have one apple each, whereas if they exchange an idea they will each have two ideas. Ideas grow exponentially, and it seems to me immoral to restrict access to research and ideas: particularly when most research is publicly funded and the public must pay twice—once to fund the research and once again to access it.

Restricting access to scientists and others in developing countries is particularly immoral. As Joseph Stiglitz, the Nobel prize-winning economist, pointed out: “Developing countries are poorer not only because they have fewer resources, but because there is a gap in knowledge. That is why access to knowledge is so important.” An ironic example of this is an article published by IngentaConnect entitled ‘Impediments to promoting access to global knowledge in sub-Saharan Africa’, the full text of which is hidden behind a pay-wall. It was an experience like this that drove Sir Mark Walport, the director of the Wellcome Trust, to become an evangelist for open access.

Another driver is money. Libraries and some scientists have become furious with scientific publishers for constantly bumping up their prices above inflation. Scientific publishers have high profit margins - for the simple reason that most of the value in what they have to sell comes to them for free. Consider a randomised trial in a journal: 99 per cent of the value lies in the research, the value added by the journal is minimal.

The calculations are controversial, but almost certainly the whole world could have open access to all studies for considerably less than is spent on the current system for disseminating research, which shuts out most of the world.

Why, then, hasn’t open access become universal already? One obvious reason is the vested interest of publishers, although many commercial publishers have begun to experiment with open access. Ironically, scientific societies could be more of a barrier due to a dependency on the profits of their journals. It does seem wrong to me that the International Society of x should make money out of restricting access to research on x.

The biggest single barrier to open access may be the irrational coupling of academic credit to where people publish. Even before the arrival of the internet I remember hearing a university president argue that it was stupid of the academic community to effectively outsource the granting of credit. Worse, it is wholly unscientific to award credit in relation to the impact factor of the journals in which people publish — because citations to individual articles and citation of the journals in which they are published barely correlate: the impact factor of journals is driven by the few articles that are very highly cited.

So I urge all scientists reading this article to publish in open access journals. Let the whole world have the chance to read your work and develop it further.

PloS One recently published a review charting the development of Open Access publishing which is available online at: www.plosone.org/article/info:doi/10.1371/journal.pone.0020961

Open Access and the MRC

It is MRC policy that peer-reviewed primary research papers resulting from any MRC funding must be freely available electronically from UK PubMed Central within six months of initial publication. To find out more, visit http://bit.ly/oX57xm

You can direct any questions about the MRC’s open access policy to Geraldine Clement-Stoneham: geraldine.clement-stoneham@headoffice.mrc.ac.uk.

24 to 30 October is International Open Access Week - a virtual event which provides a useful opportunity to find out more about Open Access publishing. For details, visit www.openaccessweek.org

Richard speaks in his own capacity and his views do not necessarily represent those of the MRC.