**A rising tide for translation**

The MRC will continue to support a vibrant and well-resourced science base... the only significant change for basic scientists is that it will be easier to contribute to the translational and public health agenda...

Members of the MRC’s Council gathered in Kingston in Surrey at the end of March to discuss several big changes to the workings of the organisation. At the heart of the discussions was the MRC’s role in the future of health research in the UK.

The introduction of an Office for Strategic Coordination of Health Research (OSCHR) in the wake of Sir David Cooksey’s review of UK health research; a separate review of the role, structure and operations of the Medical Research Council; and plans for the future of the MRC’s National Institute for Medical Research were all on the agenda.

**Light touch OSCHR**

Following the Cooksey review, publicly funded health research will be overseen by OSCHR. It will coordinate the strategies of the Medical Research Council; the new agency of the Department of Health (DH); the National Institute for Health Research (NIHR); and other government funded health research agencies.

The chair of OSCHR, Professor John Bell, president of the Academy of Medical Sciences, spoke to Council members about the opportunities OSCHR would provide in increasing the translation of research findings into benefits both for people’s health and the UK economy. He said “it’s a major change in the way we think about setting strategy and implementing it.” But he was at pains to stress that fundamental basic research was the engine room of future health improvements: “Continued, sustained investment in basic biomedical research is essential and agreed by both the Treasury and DH. Biomedical research is the fundamental basis of what we do… if we couldn’t get this right we wouldn’t do it at all.”

Professor Bell added that translational research had to be done on what he called ‘a rising tide’ of funding: “This needs increased investment to grow new activities and not endanger the basic science base.” He went on to say that the UK had to move back to a philosophy that was in place after the Second World War when strenuous efforts were made to turn good science into patient benefit. Professor Bell argued that the notion of translation had fallen by the wayside during the 1970s and 80s when it was eclipsed by ‘fantastic’ developments in basic research. It was not until after the turning of the millennium that people began to look afresh at the importance of translation. He added that he wanted to see a sustained cultural change in NIHR and the MRC so they worked ever more closely and effectively together.
To achieve the goal of increased translation, Professor Bell said he wanted to see a step change in the thinking of funders. He argued that the strategies of MRC, NIHR and other government-funded health research agencies needed to be aligned so that a truly UK-wide strategy, including the devolved administrations, could be established. New joint MRC/NIHR boards are to be set up for public health research and for translational medicine to realise this vision. Their role will be to oversee strategy and funding and to monitor the work being done. “OSCHR will be light touch but not no touch”, he added, “the onus on partner organisations is to get things right from the outset”.

New approaches and fresh thinking

Professor Colin Blakemore, MRC Chief Executive told Network: “We are discussing through OSCHR, the areas where each agency can take the lead to build new partnerships for the benefit of UK research more widely. We are actively discussing the details of these ‘lead areas’ and are fully signed up to the objectives. While these new ideas are being realised, it’s business as usual for all our funding boards and for the research community, who should continue to submit funding applications to the relevant agency until further announcements are made. We’re determined to maintain our commitment to basic research and to exploit the potential of our research to the full – a lot of thought is going into these strategies to ensure that scientists experience minimal disruption to their research plans.”

Council member Kay Davies, Director of the MRC Functional Genetics Unit and Associate Head of Department of Physiology at Oxford University, was enthusiastic about the plans. “This is a fantastic opportunity for the MRC and I’m convinced we will rise to the challenge. We have made enormous leaps in knowledge over the past few decades but now reform is needed to ensure that we continue to make the most of those advances.” She continued: “MRC basic science can be a force to drive both the economy and to improve health and we have to nurture our discoveries through working more closely with industry and other agencies and by developing new approaches.”

Fit for purpose

To ensure that the MRC can best fit into this changing landscape for health research in the UK, a team from the MRC has worked with management consultants Ernst and Young to examine the MRC’s strategy and structures.

One member of the review team, Dr Declan Mulkeen, Assistant Director of the research management group at Head Office explained: “The MRC is in an excellent position to build on its record of achievement. But change is needed to strengthen the link between discovery and developmental science. The team has suggested ways to make the MRC an even more efficient organisation that works well with its partners and is even better placed to encourage returns from research.”

The Council agreed that a number of changes should now be put in place.
The Council’s chairman Sir John Chisholm explains: “I am confident that these initial developments will ensure that the MRC is in good shape to embrace the changes to our operating environment. Further changes will be considered – for example to MRC board structures and top management structures in the office – following appointment of the new CEO to succeed Colin Blakemore whose term comes to an end this autumn.”

He added: “The Council was unanimous that, in implementing the changes, we must retain the core features for which the MRC is well-respected, most notably in funding the highest quality discovery science for health. The MRC must harness the promise of basic science through developmental or translational research, demonstrate the clear return on its investments, and work with our partners in industry and health departments.”

A possible site at the British Library near St Pancras station is to be considered. It is owned by the Department of Culture, Media and Sport and expected to come on to the market in the near future, as the MRC’s Executive Director, Nick Winterton, explained to Network: “At three and a half acres, this site is much larger than the current option at the National Temperance Hospital. Council agreed that it offers the potential to put NIMR at the heart of a world-leading biomedical research campus where researchers from different organisations and from industry can work together to ensure the outputs of research are translated into clinical practice and economic benefit.”

At its meeting in January, Council agreed that it should look at the option for developing a science park or translational centre at Mill Hill. However, subsequent discussions have revealed hurdles to such a development.

Talks with Barnet Council have indicated that no expansion into the green belt land that is part of the current NIMR site would be allowed, while the London Development Agency and two sets of advisers experienced in science park developments have all expressed reservations about Mill Hill as a suitable location for a development of this kind.

According to Nick Winterton, many of the arguments that have been developed for the draft business case for the National Temperance Hospital site would apply to the British Library site: “Both options offer the benefits of integration with the multi-disciplinary environment at University College London and its associated hospitals. Both are near the fantastic transport links of King’s Cross/St Pancras and Euston. But there is widespread support for the view that the British Library site would allow us to create a more exciting vision – a potential centre for basic and translational research excellence involving scientists and clinicians from a number of different organisations, including academia, the charitable sector and the pharmaceutical, biotech and medical devices industries. We have to explore this opportunity which offers considerable promise.”

The Council agreed that exploring the potential of the British Library site should be undertaken in parallel with the continued development of the business case for the National Temperance Hospital site.

NIMR: visions of excellence

...the potential to put NIMR at the heart of a world-leading biomedical research campus...

The MRC’s Council has described a draft business case for the future of the National Institute for Medical Research (NIMR) as sound and powerful. But the Council also called for a separate option to be pursued, which was felt would add weight to the institute’s ability to work with researchers from other disciplines, other research organisations and industry. Sir Keith Peters, the interim director of NIMR, joined the MRC’s Council to discuss the draft business case for the future of the institute.

We have to explore this opportunity which offers considerable promise.
Six new ‘translational’ centres opened

A major challenge in medical research is finding ways of translating research findings into practice. As part of its strategy to tackle this, the MRC has opened six new translational research centres.

Last year, the MRC issued a call for proposals to create research centres aimed at translating scientific discoveries into new drugs, therapies, diagnostic tools or methods of prevention; or using clinical knowledge to inform fundamental research priorities. The applications had to reflect a number of key principles. For instance, they had to develop programmes with clear milestones and strategies to overcome existing gaps or hurdles in ‘translational’ research. They also had to have a visionary strategy to exploit and implement their findings as the research developed.

The MRC selected six proposals for funding. These university-based centres will focus on transplant medicine, obesity, neuromuscular diseases, genomics and global health, outbreak analysis and modelling, and the molecular causes and indicators of disease. The total MRC investment in the centres over the next five years will be £15.5 million.
Obesity is one of the greatest health problems facing the UK in the 21st century. Its impact on the nation’s health has been compared to that of smoking. One of the clearest links between obesity and ill health is its impact on insulin resistance and diabetes. The MRC Centre for Obesity and Related Metabolic Diseases aims to increase our understanding of the fundamental causes of obesity and how it is related to insulin resistance, diabetes and cardiovascular disease. It will exploit existing links between clinical and basic research in Cambridge and will be located alongside the MRC Epidemiology Unit in the new Institute of Metabolic Science in Cambridge.

Professor Steve O’Rahilly says: “The scientists we are bringing together here come from a variety of areas within biomedical research. We also have strong links with the pharmaceutical, biotechnology and food industries. This centre will enhance these interactions to ensure that any breakthroughs in our understanding of the disease are rapidly translated into improvements in human health.”

**MRC CENTRE FOR OUTBREAK ANALYSIS AND MODELLING**

**Professor Neil Ferguson, Imperial College**

SARS and H5N1 avian influenza have recently highlighted the need to improve our readiness for new epidemics. Understanding how best to control epidemics using public health measures, travel restrictions, drugs and vaccines, is therefore critically important. The MRC Centre for Outbreak Analysis and Modelling will make this the core of its mission.

Based at Imperial College London, the centre will also involve staff at the UK Health Protection Agency. Its eight senior scientists are world leaders in epidemic modelling and have extensive experience of advising governments and international agencies on the control of a wide range of diseases, including avian flu, SARS, HIV and BSE. An important first project will be the development of the world’s first global epidemic simulator, which could be used by governments to decide how to respond to disease epidemics, such as whether schools should be shut and public transport halted. “This MRC centre has the potential to make a real difference in the world’s capacity to plan for and respond to new epidemics and pandemics,” says Professor Neil Ferguson.

**MRC CENTRE FOR NEUROMUSCULAR DISEASES**

**Professor Mike Hanna, Institute of Neurology, University College London**

The MRC Centre for Neuromuscular Diseases will be the first UK translational research centre for the study of disabling diseases such as muscular dystrophy. The centre is based at the Institute of Neurology at University College London (UCL) and will collaborate with UCL’s Institute of Child Health and the University of Newcastle. It will take full advantage of large neuromuscular patient populations at its affiliated NHS hospitals and its research programmes will cover all major diseases of muscle and peripheral nerves. Researchers at the centre will conduct clinical trials of potential new therapies and apply new magnetic resonance imaging techniques to monitor disease, and the centre will undertake education and training to develop the translational neuromuscular scientists of the future.

“Although there have been impressive advances in understanding the molecular basis of many neuromuscular diseases, this has not yet been translated into clear patient benefit or new treatments. By uniting an impressive team of experts, we are hoping to make progress in tackling these diseases,” says Professor Mike Hanna.

**MRC CENTRE FOR CAUSAL ANALYSES IN TRANSLATIONAL EPIDEMIOLOGY**

**Professor George Davey Smith, University of Bristol**

The MRC Centre for Causal Analyses in Translational Epidemiology will apply knowledge from genetic analyses to large-scale studies of the health of the population. These investigations will aim to find the factors that are causing disease, which can then be influenced to reduce risk. Identifying links between risk factors and the development or progression of diseases helps show the best ways to prevent and treat them. Traditional techniques have often been unable to work out exactly what is causing a disease because there are so many potential risk factors. This new multidisciplinary centre will apply new molecular methods for identifying the causes of disease.

“Conventional study of patterns of disease has made important contributions to understanding their causes. This centre aims to take this type of work into the 21st century, making full use of the wealth of data and methods we now have at our fingertips,” says Professor George Davey Smith.

**MRC CENTRE FOR GENOMICS AND GLOBAL HEALTH**

**Professor Dominic Kwiatkowski, University of Oxford and Wellcome Trust Sanger Institute**

The UK faces a transplant crisis. More than 6,000 patients are currently waiting for new organs and this number continues to grow. The MRC Centre for Transplantation will investigate ways to overcome the lack of available organs suitable for transplantation, increase the long-term acceptance of transplants and address the rejection issues raised by potential stem cell treatments.

More specific manipulation of the inflammatory and immune systems will increase the number of donor organs that can be used and reduce premature failure of transplanted organs and reliance on immunosuppressant drugs. Looking to the future, the centre will formulate strategies to tackle immune rejection of stem cell-based therapies. “By bringing together a wide range of expertise in basic and clinical research at a single centre, we hope to facilitate more rapid and effective solutions to the problems associated with transplantation,” says Professor Steven Sacks.

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Stepping up translation

Since 2004, the MRC has significantly increased its funding in translational research through initiatives such as experimental medicine, biomarkers, additional funding for clinical trials and the MRC Technology drug discovery and development gap programmes. Earlier this year, it held a workshop to look into what else could be done.

In February, a workshop entitled ‘Accelerating the Translation of Medical Research’ was held in Buckinghamshire. It was attended by around 50 delegates, including members of the MRC’s Council, its research boards, MRC and university researchers, research charity and industry representatives and people from the UK health departments. The group met to discuss what should be done to further accelerate translational research – the process by which research findings are turned into benefits for society. The MRC describes this as ‘the process of the bidirectional transfer of knowledge between basic work (in the laboratory and elsewhere) with that of the person, in health or disease’.

Planned months earlier, the workshop turned out to be timely in view of the publication of the Cooksey Review on UK health research funding in December and the establishment of the Office for Strategic Coordination of Health Research and the Translational Medicine Board (see page 1).

Improving and speeding up translation research is a challenge worldwide and not just for the UK. The MRC’s workshop was therefore informed by international perspectives on translational research from the US National Cancer Institute (NCI) and the Canadian Institutes of Health Research. Several key issues emerged from the discussions – the MRC will now build on these to develop and disseminate a more explicit strategy for translation in the coming months.

Cultural shifts
Delegates agreed that the MRC should take a lead in promoting a cultural change within the UK research community. They suggested that researchers should see translating research findings – whether through further research or by communicating the research to others – as part of their role.

Funders and researchers also needed to recognise that implementation of a successful strategy for translation would require new mechanisms and skills. There was a need for knowledge transfer management, by creating links between producers of research with other researchers – often in other disciplines – and with industry, venture capitalists, practitioners and policy makers.

The group also suggested that the MRC should build on the skills and expertise offered by MRC Technology for the intramural programme and extend this support to university based researchers.

Dedicated funding
Although delegates welcomed the MRC’s initiatives in experimental medicine and biomarkers, early translation – the process by which basic research findings move into first-in-man studies – was the main area identified where there was still a gap in the MRC and national research portfolio.

A lack of skilled researchers and the fact that this type of research did not always fare well in the peer-review process were recognised as being the two underlying issues.

The consensus at the workshop was that capacity building initiatives as well as a separate stream of funding should be established. These needed to be maintained over the longer-term to encourage the best researchers to move into this area and a high quality national research portfolio to develop.

Definitions and concepts
Delegates agreed that the term translation was poorly defined and often used to describe very different types of activities and research studies. They wanted to see a more precise vocabulary to describe the processes and stages. The NCI approach of developing and articulating a number of Pathways to Clinical Goals was a good example and delegates thought similar processes and presentation could be used to guide UK researchers and peer reviewers. ‘Project management also has a lot to do with translational success,’ said Dr Ernest Hawk, Director of the Office of Centers, Training and Resources at NCI. He described how the NCI has a series of translation research programmes in carefully chosen areas, which are designed to complement one another: ‘We’re trying to turn it all into a symphony in which everyone works together,’ he said.
FELLOWSHIPS
The current round of fellowships is now closed. Closing dates for the next round are currently being finalised and will be available on the MRC website by mid to late May 2007. Visit www.mrc.ac.uk/Careers/Fellowships/AvailableFellowships/index.htm to find out more.

PANDEMIC INFLUENZA
In December 2005, the MRC committed £10 million in additional funding for research to strengthen preparedness and response to potential pandemic influenza, with priority given to proposals in clinical and public health research. Closing dates for this call correspond with those of the relevant boards: the Infections and Immunity Board and the Health Services and Public Health Research Board.

There are two modes of application. First, applications via a one-off fast track process, with a deadline of 4pm on Wednesday 2 May 2007, will be assessed by an ad-hoc expert panel which will make a decision in July 2007. Alternatively, expressions of interest may be submitted to the Infections and Immunity Board (IIBenquiries@headoffice.mrc.ac.uk) by Wednesday 2 May 2007, followed by full proposals due by 4pm on 12 September 2007 and assessment by the board in February 2008. For more information please visit www.mrc.ac.uk or contact Dr Desmond Walsh at desmond.walsh@headoffice.mrc.ac.uk.

**OPPORTUNITIES**

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**CALLS FOR PROPOSALS**

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**TRANSLATIONAL VACCINE RESEARCH CALL FOR PROPOSALS**
The vaccines call for proposals is a new initiative spurred by a recent review of vaccine research by the MRC's Infections and Immunity Board. With £3.5 million earmarked for the call, it will focus on strengthening multidisciplinary and collaborative research in key areas including T cell biology, adjuvants, vaccine biomarkers, mucosal vaccines and assay standardisation. Applicants must demonstrate strong mechanisms for ensuring translation of research findings, and must specify verifiable outputs and indicators of successful translation. Proposals may involve several universities, industrial partners, MRC units, other research councils and funders. For this call only, the UK’s national health protection agencies and the National Institute for Biological Standards and Controls may apply as sole or co-applicants, under the same terms and conditions as higher education institutions. The MRC is also willing to consider funding arrangements with commercial organisations or other research funders.

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Animal technicians’ training demands met

Managers of MRC animal facilities and the Learning and Development Group at MRC Head Office are working together to expand the qualifications available to animal technicians throughout the MRC. The changes follow a successful pilot.

Dr Kathleen Mathers, head of Biological Services at the National Institute for Medical Research (NIMR) is leading the project to improve training opportunities for animal technicians. She explains: “MRC animal technicians were surveyed in 2004 about how satisfied they were in their jobs. The survey found that technicians wanted more relevant and practical qualifications and more choice in qualifications on offer – a need we were keen to address.” As well as increasing and improving training on offer, the learning and development group and managers at animal facilities are working to standardise the roles, qualifications and job titles of animal technicians. They have also produced a virtual e-learning induction pack for new recruits, which incorporates a range of different learning techniques to introduce the principles of being an animal technician.

Following the survey, a pilot study was set up to assess using level 2 National (or Scottish) Vocational Qualifications (NVQ) to provide on-the-job training and qualifications in basic animal technology alongside MRC key skills training. NVQs are work-related, competence-based qualifications for specific groups of workers. They reflect the knowledge and skills needed to do a job effectively and are recognised by employers throughout the UK.

The pilot study began in 2005 at three MRC sites: NIMR at Mill Hill in London, the Laboratory of Molecular Biology in Cambridge and the Mary Lyon Centre at Harwell, Oxford. Animal technicians with a wide range of experience, practical ability and prior education and training took part. Instruction was provided by Somerset Training Services Ltd, a leading City and Guilds approved centre in the southwest of England. Someone from each unit was trained and certified as an NVQ assessor and all work was monitored by Somerset and verified by City and Guilds.

As well as mandatory units, the NVQ modules tested varied depending on a technician’s daily duties and the science they support. For example, they included learning about breeding skills, preparation of animals’ environments for scientific procedures and assisting in carrying out such procedures.

The results were very positive and the animal technicians who took part are now awaiting certification from City and Guilds. The pilot scheme took 1-4 months from initial assessor meetings to completion of modules by candidates. Some aspects were found to be time consuming, such as writing course questions to a high standard, but the preparatory work has meant that the scheme will now be easier to roll out to the rest of the MRC.

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Staff at other MRC units are now being trained as assessors and further candidates are being enrolled on the scheme. In addition, animal technicians with higher levels of responsibility are now embarking on NVQ level 3 training at the institutes that took part in the pilot study.

Dr Mathers says: “The scheme has proved to be a useful and valuable approach to training animal technicians within the MRC and effectively meets our business needs. Not only is the scheme practical and user-friendly, it involves all staff in the delivery of training programmes and has increased the options for training.”
The field of respiratory research is to experience an influx of talented early career scientists when 21 new PhD students are funded. Their projects address the role of factors as diverse as the effect of fungi, viral infection, immune system reactions and the influence of maternal diet on asthma, chronic obstructive pulmonary disease and other serious respiratory conditions.

The awards have been made in response to the growing number of people in the UK who suffer from respiratory disease.

They were funded by the MRC and the medical research charities Asthma UK, the British Lung Foundation and the British Thoracic Society (with the Morrison Davies Trust). The funders hope that by encouraging early career scientists to study conditions that affect the respiratory system, there will be a greater capacity to develop knowledge of these illnesses and new treatments in the future. This funding collaboration was prompted by the report of a workshop attended by clinicians, scientists, research charities and other research funders in October 2005. The report reviewed the current standing and future of respiratory medicine research in the UK.

Professor Stephen Holgate, the new chair of the MRC’s Physiological Systems and Clinical Sciences Board, said: “More and more people in the UK are becoming ill as a result of respiratory conditions. Two major disease areas, lung cancer and lung fibrosis, were still under-represented in the research applications. However, this simply highlights why it is so important that we encourage early career scientists to begin their careers in respiratory research, build their knowledge and find out more about how and why these conditions are on the rise so that we can offer effective treatments in the future.”

Thirteen awards will be made available in 2007 and a further eight in 2008. Students all over the UK will carry out a three- or four-year research project and receive training in research methods and key personal skills. The first awards have been made to scientists in Aberdeen, Edinburgh, Southampton, Manchester, Nottingham, Leicester, Glasgow, Leeds, Sheffield and London.

**Shared Service Centre update**

The MRC Shared Service Centre (SSC) has been building on the experiences of its first year to improve services to its customers.

The new director, Anthony Draper, joined in January. He says: “I am committed to improving the SSC’s performance in providing service to staff in MRC units and at Head Office. A complete review of current processes is now underway, which will help the SSC to find meaningful ways to measure productivity and target areas for improvement.”

Throughout the coming months Anthony will visit units and meet staff who deal with the SSC on a day-to-day basis.

The SSC’s operational teams are continually improving, and all SSC staff have now undergone ‘one voice’ customer service training: this provides them with consistent approaches to delivering service and responding to queries. Meanwhile, the volume of finance and recruitment-related work has been higher than expected, but staff are working hard to cope with this demand.

Additional resources are now being directed into specific areas and incoming work is being refocused to assist with workflow.

Ellie Ross, head of Business Development and Continuous Improvement, is coordinating and managing projects across the SSC and is currently working to prioritise and align these. One of these projects aims to help units submit requests in the correct format so that work can progress smoothly through the SSC.

…find meaningful ways to measure productivity and target areas for improvement…
to characterise the processes that the ear and brain use to separate concurrent sources of sound. The unit has also carried out large-scale studies of hearing in UK adults and children, identified some of the causes and consequences of hearing loss in youngsters and evaluated the introduction of cochlear implants (see box, page 12).

An increased focus and change of tack: the auditory brain
When Professor Dave Moore took over as director in 2002, IHR decided to focus on an area of research that was already strongly represented – the ‘auditory brain’, or the role of the brain in hearing.

Although the ear is involved in important initial processing of sounds, it is the brain that is primarily responsible for listening – particularly to speech. In the brain, signals generated in the ear combine with signals from the other senses – such as vision – to form the basis of perception and subsequently of action, for example, enabling speech. As well as sensory input, the auditory brain is strongly influenced by cognitive factors such as attention, memory and learning. These factors significantly influence the mechanisms of listening, not only in the cerebral cortex – the part of the brain where most sound processing happens – but also lower down the auditory system and possibly right out to the ear (see diagram).

Understanding how these combined influences of hearing, cognition and feedback processing in the brain fuse to produce listening is one of the major goals of IHR.

Another goal is to understand what can and does go wrong with these various systems. For example, why do impaired listeners have such trouble listening to a particular sound in the presence of other interfering sounds, such as hearing a conversation in a noisy pub (known as the cocktail party effect)? The institute’s third major objective is to develop tools for treating hearing impairment. As well as research on how to improve outcomes for patients receiving hearing aids and cochlear implants, the institute is studying fundamental and applied aspects of auditory learning and training. This research has the potential to help, among others, children whose difficulty processing sounds contributes to learning impairments such as dyslexia and autism.
Leading the way
Dave completed degrees in physiology and psychology at Monash University in Melbourne, Australia, before moving to Oxford University in 1980. He became Professor of Auditory Neuroscience in 2000 and took up the directorship of IHR in Nottingham two years later. Dave’s early work was on central auditory mechanisms in animals. More recently, he has been interested in hearing and its disorders in children, while his current research interests centre on auditory processing disorder in children and auditory learning.

Dave says: “The institute’s increased focus on the auditory brain since my arrival meant that some of the principal investigators who were here before decided to move on and I brought in a new team who were more interested in the pathways and processes involved in hearing in the brain. That said, one of the great things about this unit is the quality of the support staff, who have been here a long time and know the field from back to front.” And it’s not hard to see why they’ve stayed so long. The institute has a relaxed and friendly atmosphere but at the same time a real sense of purpose and dedication.

The range of research within the theme of the auditory brain is broad. Current projects being undertaken by IHR’s world class scientists include behavioural and cellular neuroscience, functional and structural imaging of the brain, dynamics and development of human auditory processing, spatial and binaural hearing, neural aspects of cochlear implantation, speech reading and causes and management of hearing impairment.

Biological processes
IHR scientists study both humans and animals to try to work out the biological processes that occur in the brain when we listen to sounds and speech. Professor Alan Palmer, Assistant Director of IHR, is one of the institute’s longest-serving investigators, having been there for 21 years. “The scope of my research has changed over the years, as has the whole of the auditory research community,” he says. “I used to mostly study the cochlear nucleus – this is the switchboard that redirects information from the ears into the brain – and the auditory nerve, which connects the ear and the brain. But my research has now moved higher up in the brain. My team’s most recent focus has been on the auditory brain’s ‘efferent’ system that conveys highly processed information from the cortex back down to the brainstem and the ears.”

The auditory brain is more complicated than the other sensory parts of the brain, with between seven and 10 different stations involved in relaying information between the ear and the cerebral cortex. A large amount of Alan’s time goes into trying to understand how this works. His team uses different methods, including testing psychological reactions to physical stimuli and imaging techniques for visualising nerve cells and networks.

Neuroimaging is a particular strength of the institute due to its location in Nottingham. Much of the pioneering work on magnetic resonance imaging (MRI) was done there, and the university remains a strong centre for MRI research. Supporting this is the fact that one of very few extraordinarily powerful 7-tesla (7T) MRI scanners in Europe is housed there. Alan works with colleague Dr Deb Hall on the 7T scanner. One of their previous projects involved building a sound system that could be used for various hearing tests while study participants were inside the scanners – a challenge because no metal could be used. But they succeeded, and such systems are today used in many MRI scanners around the country. They are now devising a way to acoustically cancel the noise the scanner itself makes.

Visualising the working auditory brain
Dr Katrin Krumbholz heads the human electrophysiology group in Nottingham. Her team combines electroencephalography (EEG) with functional magnetic resonance imaging (fMRI) to try to find out how sound information is encoded by the brain. She is particularly interested in what goes on in the brain in real time – research that will benefit immensely from the recent purchase by Nottingham University of a magnetoeencephalography (MEG) scanner. This new scanner works similarly to an EEG but picks up magnetic rather than electric impulses to show brain activity. Unlike EEG, MEG scanners can show scientists what is happening in real time. “This is important because the auditory system seems to have a special mechanism for localising sounds. It can detect minute time differences in sounds arriving at the ears to help work out where they are coming from,” says Katrin. “It is very precise – much more so than any other sensory system.”

Katrin’s team also carries out behavioural experiments in which people are asked to detect and distinguish different sounds, using computer modelling to try to understand how the brain processes sound. The ultimate aim is to bring all of these techniques together and use the knowledge gained to improve interventions for people with hearing problems. She says: “Cochlear implants are not good at conveying spatial sound – telling people where a sound is coming from, because they don’t convey information about the timing of sounds accurately enough. If we could understand why the auditory system does this so well, we could emulate it to improve these devices.”
Speech reading
Another thread of IHR’s work is to improve interventions for hearing impaired people through research into speech reading. Dr Sharon Thomas, who heads this team, joined IHR in 2003 after several years researching aspects of visual and audiovisual speech perception. She says: “It’s very hard to make people better speech readers, but doing this can dramatically improve what they hear – by about 30 per cent.”

The visual appearance of speech varies immensely – due to factors such as someone’s sex, individual anatomy and regional accent. Despite this, the brain can be remarkably adept at extracting the properties that don’t vary among different people and that provide the visual cues to the speech we hear. Speech reading is neither easy nor accurate. However, it is indispensable to multitudes of hearing-impaired people who use it daily to communicate effectively. The overall aim of Sharon’s research is to train individuals to make the most of the use of the speech reading skills they do possess. “This work will also lead to important advances in our understanding of how we recognise speech in general, and how we recognise the essentially unlimited visual and auditory variations of the same spoken words,” she says. Her team is also studying how speech reading can help people adapt to cochlear implants. “When these are first implanted sound can be very hard to understand, but when paired with lip movement and facial expression it becomes much easier to decipher,” says Sharon.

Regional sections
While the main part of the IHR is in Nottingham, it also has regional centres based in the ear, nose and throat departments of hospitals in Nottingham, Glasgow and Southampton. These clinically-based branches work in partnership with and are funded by the NHS and the Chief Scientist Office of the Scottish Executive Health Department.

In each regional branch, MRC staff work alongside health authority staff on fundamental research and clinical projects. The locations of the centres provide access to patients for clinical research and facilitate easier translation of research into clinical practice. “This set-up helps us to use the knowledge we gain in the lab to develop applications for real world problems – our links with clinicians who tell us what they’re dealing with in daily practice are very important,” explains Dave Moore. The regional sections also collaborate with other organisations, including the MRC Hearing and Communication Group at Manchester; the Royal National Institute for Deaf People and the Institute of Sound and Vibration Research at the University of Southampton.

IHR’s Southampton section is headed by Professor Roger Thornton and Dr Stefan Debener who are particularly interested in the influence of cognition on auditory EEG. The Nottingham Clinical Section, headed by Melanie Ferguson, an audiological scientist, studies auditory processing disorders in children. Sadly, Professor Stuart Gatehouse, formerly head of the Glasgow section, died suddenly on 16 February (see obituary; page 13). Stuart had an international reputation for translational hearing research, and that tradition is being continued by the acting head, Dr Michael Akeroyd.

Future focus
The tradition of translational research at IHR, begun by Stuart Gatehouse and Mark Haggard, is being continued and extended by Dave Moore and his staff, both in changes to clinical practice to benefit patients, and in the commercial development of devices and software. For instance, there are plans for more work on hearing loss and auditory training planned, including finding out more about the benefits of cochlear implants in both ears. Of around 100,000 implant users around the world, only 200-300 have these bilateral implants. “While this is very useful for spatial hearing, we don’t yet know how bilateral implants might benefit other forms of listening, such as auditory scene analysis,” says Dave. Auditory scene analysis is a naturalistic approach to hearing research being pursued at IHR in cochlear implant users and people with normal hearing by Dr Bernhard Seeber, a recently appointed team leader.

“One of the great things about being in a unit is the ability to focus on a particular area of research. Having a critical mass of people working on a relatively unified question really helps to drive things forward,” Dave adds.

COCHLEAR IMPLANTS
A cochlear implant is an electronic device that recreates a sensation of hearing in severely or profoundly deaf people.

The external part of an implant consists of a microphone, which picks up sound and converts it into electronic signals, a processor and a transmitter, which transmits the processed signals into the inner part.

The inner part is surgically implanted inside the ear. It comprises a receiver with a magnet that holds the external transmitter directly over the receiver. This picks up signals from the transmitter coil and sends it to a set of electrodes which are implanted into the cochlea in the inner ear. The electrodes then send the electrical signals along the auditory nerve and into the brain.

People with a cochlear implant do not hear sounds in the same way that people with normal hearing do. But with help, they can usually learn how to recognise and interpret the sounds they do hear and communicate normally. Those who seem to benefit the most are adults who have lost their hearing after learning language and communication skills, and children who have not yet learned to speak and receive an implant at a young age. IHR has recently begun a study of the best methods for training children with cochlear implants to recognise sound and speech. Most people only receive an implant in one ear. IHR scientists are also looking into the benefits of implants in both ears.
SIR IAN MCGREGOR (1922–2007)

Director of the MRC’s Gambian unit for 23 years and a pioneer in tropical medicine, Professor Sir Ian McGregor died in February aged 84.

Sir Ian devoted his life’s work to malaria research. A major achievement was his finding that humans exposed to repeated infection with malaria could develop immunity, and that this could be transferred to non-immune individuals. His work established the basis of a search for a vaccine. Even today, extensive population-based studies begun by Sir Ian are continuing to yield results.

Born in 1922, Sir Ian qualified in medicine in 1945. He trained as a malariologist in Gaza during two years of military service, before studying at the London School of Hygiene and Tropical Medicine, during which time he was offered a post in a new MRC-funded unit in The Gambia. In 1954, he was appointed director of the unit, a post that he would retain until 1980. Sir Ian set up long-standing directorships, including at the sugar company Tate and Lyle and the engineering giant Davy Corporation. In 1977 he became chairman of the Council of King’s College London and in 1984 chancellor of Southampton University.

In 1980 he moved to the Liverpool School of Tropical Medicine as a Professorial Fellow, where he remained until 1994. Throughout his career Sir Ian served as chairman and member of a number of WHO committees and MRC committees and boards and received many accolades and awards. He is survived by his wife Joan and their two children, Lesley and Alastair.

DR ANTHONY KEBBA (1970-2007)

Dr Anthony Kebba died suddenly in February. He is survived by his wife and two young children.

Born in Uganda, Dr Kebba trained in Kampala before moving into research on HIV/AIDS in 1997. He obtained a Rogers Fellowship from the MRC and later a PhD in immunology from Imperial College London with support from the Wellcome Trust. He worked at the MRC Uganda Research Unit on AIDS which is based at the Uganda Virus Research Institute and served as a principal investigator on work supported by the International AIDS Vaccine Initiative. Most recently he held career development fellowships from the Wellcome Trust and the European and Developing Countries Clinical Trials Partnership Programme (EDCTP). He was also appointed honorary lecturer at Imperial College London. Dr Kebba’s research interests included the immunology of HIV infection, in particular among exposed seronegative individuals and those with early infection.

Heiner Grosskurth, Director of the MRC’s unit, paid tribute to “a young but already internationally acknowledged scientist, a dear colleague, an important role model, a champion of African science, a gentle and resourceful young man with great promise of further contribution to the scientific growth in Uganda, and an excellent servant of the institutions with whom he worked.”

EARL GEORGE JELLCIOE (1918–2007)

Early Jellicoe, who served as Chairman of the MRC’s Council from 1980 to 1992, died in February aged 89.

George Jellicoe was born in Hatfield, Hertfordshire in 1918. Born into a privileged environment, he took his late father’s title of Earl at 21. He studied at Cambridge before moving to Germany for a year to learn German, set on a diplomatic career.

For the next few decades, Earl Jellicoe worked for the Foreign Office and then entered politics; both careers were set back after high profile sex scandals. Undeterred, he then took on a number of directorships, including at the sugar company Tate and Lyle and the engineering giant Davy Corporation. In 1977 he became chairman of the Council of King’s College London and in 1984 chancellor of Southampton University.

Also heavily involved with scientific bodies, Earl Jellicoe became chairman of the MRC in 1982 and was a formidable defender when its budget was under immense pressure. He battled successfully for money to be devoted to AIDS research, and was made a Fellow of the Royal Society in 1990, a rare honour for a non-scientist.

STUART GATEHOUSE (1950–2007)

Professor Stuart Gatehouse, Assistant Director of the MRC Institute of Hearing Research (IHR) died suddenly in February, aged 56.

Professor Gatehouse made many notable advances in audiology particularly in the scientific description of how hearing aids provide benefit in listening environments, and in understanding the nature of auditory disability. For 27 years he was the scientist in charge of IHR’s Scottish Section in Glasgow.

Growing up in England, Stuart Gatehouse studied physics at the University of Sussex and then went on to complete a PhD in Glasgow. His dissertation was on non-invasive recording of the brain’s electrical responses to sound, research he had carried out at Mearnskirk Hospital and Western Infirmary. This marked the beginning of a lifelong passion for the application of high-quality science to clinical problems.

Professor Dave Moore, Director of the IHR, said: “Stuart was immensely generous with his time and he was everything a senior scientist should be: smart, creative, hard-working, proactive, thoughtful, punctual, loyal, and absolutely reliable. His loss will be deeply felt for a long time to come.” Stuart is survived by his wife, Anna, and two sons, Richard and Vincent.
Diamond Light Source, the UK’s new synchrotron facility, opened for business and welcomed its first scientific users in February.

Diamond is one of the brightest light sources in the world and produces x-ray, infrared and ultraviolet beams to allow scientists to probe deep into the basic structure of materials. This gives them the opportunity to tackle a host of fundamental questions – from deciphering the building blocks of life to finding out about the origins of the earth.

Among the first scientists to use Diamond is Professor Dave Stuart, MRC Professor of Structural Biology at the Wellcome Trust Centre for Human Genetics at the University of Oxford. He is using a research station at the synchrotron – dubbed a ‘beamline’ – called the Macromolecular Crystallography Beamline I03 to help in drug design. The project, funded by the MRC and Cancer Research UK, will provide information vital to the creation of more effective drugs to combat certain types of cancer.

Professor Stuart says: “Studying how important molecules interact within the human body allows scientists to find out about not only the normal processes that keep us healthy, but also what happens when these processes go wrong, leading to illness. This knowledge can then be used to find out how we might be able to put a molecular ‘spanner in the works’ to correct the fault and treat the disease.”

Academic teams from Oxford, Durham, Leicester and London have all been selected as the first users of Diamond. The projects were selected from 127 proposals received last year from the synchrotron user community. They include using Diamond to study the properties of magnetic materials and to examine samples from a meteorite to gain insight into the history of our solar system.

Synchrotron radiation allows scientists to probe the structure and properties of any substance, shedding light on areas as diverse as medicine, materials science, chemistry, geology, environmental science, structural genomics and archaeology. A powerful magnet inside the synchrotron bends high energy electrons that are accelerated around a synchrotron ring. This generates extremely bright light that can be used at a number of different workstations – called beamlines – to probe the structure of proteins.

The Diamond synchrotron is housed in a futuristic doughnut-shaped building which covers the area of five football pitches. Ultimately it will host up to 40 beamlines, supporting the life, physical and environmental sciences. The first projects, including Professor Dave Stuart’s work (see main text) will be carried out in seven experimental beamlines.

OBITUARIES

PROFESSOR JOB BWAYO (1945–2007)

A pioneer in AIDS and tropical disease research, Professor Job Bwayo died in February, the victim of a carjacking in Nairobi, Kenya. He is survived by his wife and four children. His untimely death has resulted in the loss of one of Africa’s leading AIDS researchers.

Professor Bwayo was educated at the University of Nairobi in Kenya where he was awarded a medical degree in 1975 and a PhD in immunology in 1985. He was at the forefront of testing the first HIV vaccine in Africa and was a key researcher in the Kenya Aids Vaccine Initiative trials at the University of Nairobi, undertaken in partnership with the MRC. Professor Bwayo informed discussions around how trials of the vaccine were to be conducted in Kenya, which led to the first state-of-the-art HIV vaccine laboratory in east and central Africa.

Keen to encourage research collaborations across Africa, Professor Bwayo played a critical role as co-director of the Regional AIDS Training Network for STD/AIDS and as a senior member of the World Health Organization Collaborative Centre for STD/HIV Research Training.
Around 10,000 people attended this year’s Cambridge Science Festival in March. Network catches up on the week’s activities.

More than 100 scientists and other staff from eight MRC units and centres took part in activities and exhibitions at this year’s Cambridge Science Festival. As well as being great fun for all ages, the festival offered insights into science and gave scientists a chance to communicate the human story behind the research and an opportunity to gauge public opinion at first hand.

The week kicked off with a lively discussion event, ‘Can we trust scientists?’, where Tim Radford of the Guardian chaired a panel of MRC and other scientists addressing cancer research, research integrity, biotechnology and the philosophy of science.

Professor Colin Blakemore, Chief Executive of the MRC, gave a public talk describing the challenges of turning today’s discoveries in the laboratory into the healthcare advances of tomorrow. He was followed by MRC Professor Austin Smith, Director of the new Wellcome Trust Institute for Stem Cell Research, who introduced his exciting new work in Cambridge. To complement this, the MRC joined with the Babraham Institute in its ‘Stem cell science – hope not hype’ exhibition.

As part of the main public events programme, many MRC units showed off their science in the ‘Biology zone’ in the centre of Cambridge. The Cancer Cell Unit created an event called ‘Cancer biology – the large and the small of it’ to show that although cancer is a big disease that touches so many lives, its origins come from small changes in the body’s DNA. Visitors discovered how this occurs and talked through how ongoing research may help to improve the early detection, diagnosis and treatment of cancer. Scientists from the Cancer Cell Unit also took a roadshow to three schools to explain the fantastic journey of food, including good nutrition, digestion and imaging systems available to explore the gastrointestinal tract.

Among other highlights was the Laboratory of Molecular Biology’s ‘Body Clocks – are you an owl or a lark?’ Body clocks control some of our most vital internal functions and visitors found out why we can feel so awful when we are disrupted by shift work, jet lag, sleep disorders or simple old age and how MRC scientists have unravelled some of the mysteries of circadian rhythms. LMB staff also worked collaboratively with the university’s Department of Chemistry in ‘Crystal Clear’, a demonstration of crystals.

‘Exploring Mind and Brain’ was an event put on by the Cognition and Brain Sciences Unit. Visitors took part in experiments and presentations aimed at learning about how the human brain makes sense of spoken language, deals with emotions and stores memories. And the Dunn Human Nutrition Unit, together with members of LMB, created a colourful and imaginative table-top quiz on the body’s energy, called ‘The big energy issue – muscle, heart, brain or stomach?’

Meanwhile, the MRC Epidemiology Unit invited people to find out if they are a fitness fiend or a couch potato – and what lifestyle means for their health in ‘Get your pulse racing!’ The Collaborative Centre for Human Nutrition Research (HNR) led visitors through the science of ‘Small nutrients – Big benefits’ from ‘molecules to man’ and highlighted the importance of small amounts of nutrients and their benefits for our health. This complemented a ‘Question Time’ style event at a local café called ‘The Truth About Food’. People with questions about nutrition were invited to put these to a panel of leading HNR nutrition scientists who debunked some food myths and offered advice to help change people’s diets.

In ‘Statistics behind the headlines – from bird flu, to MRSA and ageing’, scientists from the Biostatistics Unit explored epidemics, compared the performance of schools, hospitals and prisons, and looked at the effectiveness of new drug treatments and their cost in a bid to explain how science faces up to and deals with uncertainty.

To top off a fantastic festival, the University of Cambridge Behavioural and Clinical Neurosciences Institute, which is funded by the MRC and the Wellcome Trust, engaged with the public in ‘From synapse to mind: the big and the small in cognitive neuroscience’. This event examined the mind and brain at a large scale, where networks of cells work together, and at a very small scale, where chemicals in tiny gaps between cells affect our mind and behaviour.
Getting involved in public engagement

A new section of the MRC’s website has been launched to show the range of public engagement schemes available to MRC researchers. The news, views and events’ section of the site provides links and further information on a number of activities - ranging from writing competitions to parliamentary pairing schemes – to develop and use researchers’ science communication skills.

“Studies we have carried out show that many scientists are keen to fulfil their public engagement commitments but lack the time and the opportunities to get involved,” said the MRC Chief Executive Professor Colin Blakemore. “This new resource provides, for the first time in a single place, a series of ‘tailor-made’ engagement opportunities, taking the leg-work out of planning and facilitating science communication activities.”

Max Perutz science writing

Now in its tenth year, the MRC’s Max Perutz science writing prize is an opportunity for MRC PhD students to hone their popular writing skills by penning a short article on their research. Dr Laura Nelson, now a science writer at MRC Head Office, won a prize in the 2002 competition while working towards a PhD at the National Institute for Medical Research. “The competition is a good opportunity to develop skills in communicating to a lay audience,” she said, “and enables you to see your research in a wider context.” The closing date for entries this year is 4 May; award-winning writer Ian McEwan is on the judging panel. First prize is £1000 and the winning article will be published in The Guardian.

Royal Society MP pairing scheme

For Dr Mark Ungless, a neuroscientist at the Clinical Sciences Centre in Hammersmith, taking part in the Royal Society’s annual MP-scientist pairing scheme provided him with an opportunity to interact first-hand with those who influence and form science policy in government. Mark invited CSC constituency MP Andrew Slaughter to visit the institute, and in return spent four days shadowing the MP in parliament. “Before I took part in the scheme I suppose I didn’t have a clear idea about how science fits in at parliament,” said Mark. “I feel I now have a better grasp of the structure of the various committees and the ways in which science policy can be formed.”

Other MRC-supported projects include the Researchers in Residence scheme, enabling scientists to interact with schools. Its website, www.researchersinresidence.ac.uk, has just been relaunched.

Strengthening science coverage through collaboration

Although a press officer and a scientist have different tools, getting a science story into the pages of a broadsheet newspaper and a researcher’s words heard on the radio aren’t as far removed from a scientist’s working world as you might imagine. Both may need to collaborate with others in their field, both go through rounds of ideas and countless drafts of papers and both are concerned about how their work will be interpreted.

Scientists and press officers know that collaboration can sometimes be difficult. But working with other experts can also create the best results. With this in mind, the MRC and Wellcome Trust press offices arranged a one-day conference to bring press officers from funding bodies and universities together to discuss ways to strengthen media coverage of science.

Sixty-five press officers, mostly from Russell Group universities, and 15 from research charities attended. Wellcome Trust director Professor Mark Walport introduced the event and stressed the importance of interaction with the media, saying that reaching policy makers and other key stakeholders was clearly in the interests of all scientists. Katrina Nevin-Ridley and John Davidson, heads of the two media teams, explained why the research funder needed to be involved in press work, arguing that working together would lead to a greater focus on science in the media generally – a result that would benefit everyone. Professor Colin Blakemore drew on his experience of discussing controversial scientific issues. He argued that openness, honesty and speed would improve coverage of controversial issues.

The press officers then split into groups to discuss the controversial issues they respond to daily. Animal use, embryo and genetic research topped the science list. Difficulty convincing scientists of the value of media work, responding to stories without a clear origin and misplaced endorsements were also common ground.

Delegates also heard from Ruth Francis of Nature’s press office who explained the challenges journals face. Later, the Science Media Centre director, Fiona Fox, led a question and answer session with a panel of broadcast, print and web journalists, including Ian Sample from the Guardian and the BBC’s Christine McGourty who explained how they were determined to report science stories accurately.

Concluding the event, John Davidson, head of the press, web and publications team at the MRC, described a revolution in the press: “The media is changing,” he said. “Free newspapers are putting pressure on print editions and people increasingly seek fresh news online. Podcasting will help scientists voices to be heard and RSS news feeds deliver the latest news straight to people’s desktops. Opportunities for science coverage are growing, and as press officers we need to equip our scientists to engage with the media so that their achievements are shared, appreciated and most importantly, understood, by the widest possible audience.”

If you would like media training or want to find out more about working with journalists, please email press.office@headoffice.mrc.ac.uk.
Physics students visit Clinical Sciences Centre

A group of A-level physics students and their teacher were inspired by a visit to the Imaging Sciences Department (ISD) at Hammersmith Hospital Campus, Imperial College London in March. The students, from Merchant Taylor’s School in Middlesex, spent an afternoon at the centre finding out about magnetic resonance imaging (MRI) scanners and seeing them in action.

Before entering any of the rooms housing the MRI scanners, the students were given a safety briefing and ISD staff ensured the visitors had no metal objects either in their pockets or within their body. The students were also shown somewhat alarming pictures of what happens if magnetic objects get too close to MRI scanners – flying towards them and getting permanently stuck to the scanners.

The students then split into three groups and visited the neonatal MRI scanner within the neonatal unit of Hammersmith hospital, thought to be the only such facility in the world, followed by the Robert Steiner Magnetic Resonance Unit and the high-field magnetic resonance spectroscopy facility. The scanners were in use – including the neonatal MRI scanner – so the students were able to see for themselves the fascinating structure of an infant brain and a beating heart in action.

Dr Jane Cox of Imperial College, who coordinated the visit, said: “It was fantastic to show the students the state-of-the-art magnetic resonance technologies and to illustrate the range of scientific and clinical expertise involved in the research.”

Nigel Blight, the students’ physics teacher, added: “The visit to the hospital was an exciting change from the essentially theoretical perspective of the classroom; actual patients with real conditions were being scanned and it was encouraging to see a theoretical principal being put to good practical use.”

A poster session with a difference

Postgraduate and postdoctoral scientists funded by the UK research councils are invited to explore the social and ethical implications of their research by entering the perspectives poster competition. Sponsored by Research Councils UK, the scheme gives scientists the opportunity to design and exhibit a poster at the 2007 BA Festival of Science at the University of York (see www.the-ba.net/FestivalofScience for more information about the festival).

Posters will be judged by a panel of expert science communicators. A prize of £750 is up for grabs for the overall winner, as well as the opportunity to give a press conference at the festival. Two runners-up will each receive £350 and a people’s choice award of £350 will be voted for by festival attendees. Successful applicants will be invited to attend a workshop in London (on either 26 June, 4 or 12 July) to develop their communication skills and to design their poster. They will then present their posters at the BA festival on 12 and 13 September. Four nights’ accommodation and travel expenses will be met by the BA.

The online application form can be found at www.the-ba.net/perspectives. The application deadline is Wednesday 16 May and applicants will be notified of the outcome by Friday 25 May.

Cheltenham Science Festival

From 6 to 10 June, the MRC will present a series of events at the annual Cheltenham Science Festival. These will include a hands-on interactive family exhibition in the festival’s Discovery Zone and workshops hosted by MRC stem cell scientists and by Dr Lizzie Burns, who will work with families to create stem cells out of air dough.

The Biotechnology and Biological Sciences Research Council/MRC Hope not Hype stem cell exhibition will also be on display. Visit www.cheltenhamfestivals.com to find out more.

MRC public Council meeting

The MRC will hold its third open Council meeting on 25 July at Lord’s Cricket Ground in London. The meeting will give attendees an opportunity to have input into key Council discussions, hear about our achievements over the past year, and join in a panel debate about current topics relevant to the MRC’s mission. For more information visit www.mrc.ac.uk/NewsViewsAndEvents/Events/AnnualEvents.
**Vitamin A inhibitors could help prevent gullet cancer**

Barrett’s oesophagus is a condition which causes the scaly lining of the oesophagus to be replaced by a glandular lining like that of the stomach. It develops into oesophageal cancer in up to 10 per cent of sufferers but until now scientists have not known what causes it. Researchers led by Dr Rebecca Fitzgerald at the MRC Cancer Cell Unit have found that treating the normal scaly tissue of the oesophagus with vitamin A provokes changes to Barrett’s cells. It was previously thought that these changes were limited to the top layer of cells. “Until now it had been thought the changes to the cells in the oesophageal lining were limited to the top layer of those cells, the epithelium. This research shows that the change is actually more fundamental,” said Dr Fitzgerald. When the researchers later treated the altered tissue with vitamin A inhibitors, the cells reverted back to their previous state. “We are very excited about these findings. Vitamin A inhibitors could allow us to reverse Barrett’s oesophagus, which would prevent the lesions it provokes from causing cancer,” she added.

*Gut 2006: Online first*

**Brain chemistry linked to drug addiction**

MRC-supported scientists suggest that variations in brain chemistry mean some people are more likely than others to become addicted to drugs even before they have used them. Dr Jeff Dalley and co-workers at the University of Cambridge Behavioural and Clinical Neuroscience Institute studied changes in receptors in rats’ brains for dopamine – a neurotransmitter that affects emotion, perception and movement. Rats which had not been exposed to cocaine but were naturally impulsive had fewer dopamine receptors. They were more likely to self-administer cocaine when given the chance than other rats. The results illustrated a link between impulsive behaviour and vulnerability to drug addiction, and that changes in dopamine receptors pre-date drug use rather than being caused by it. “The next step is to identify the possible genetic basis of this diminished supply of brain receptors. This may provide new leads in the search for improved therapies for compulsive brain disorders such as drug addiction,” said Dr Dalley. The research also has implications for treating attention deficit/ hyperactivity disorder, of which impulsive behaviour is a common feature.

*Science 315: 1267-1270*

**Clue to high blood pressure cause**

Blood pressure regulation is linked to salt concentration in the blood – if too much salt is present, blood pressure can become dangerously high. By studying Gordon’s Syndrome patients, who have exceptionally high blood pressure, scientists at the MRC Protein Phosphorylation Unit in Dundee have managed to capture a cell’s reaction to salt on film. The images show proteins called WNK1 marshalling themselves within the cell as it is threatened by dangerously high salt levels. The research has shed light on how blood pressure is regulated in healthy people. When salt levels are normal, the WNK1 protein is evenly distributed in spaces between the internal structures of the cell. Within seconds of the scientists adding more salt, the protein rapidly altered its position, moving to surround internal cell structures. It stayed next to these as long as salt levels remained high. Lead researcher Dr Dario Alessi explained: “When cells are exposed to too high a salt environment, the movement of WNK1 to internal structures could be the switch for a series of molecular pathways that play important roles in enabling a cell to tolerate and respond appropriately to such conditions. Humans with mutations in the WNK1 gene may have altered ability to mount such responses and this in turn might result in increased blood pressure.” He adds: “We are now trying to understand the exact importance of the rapid movement of WNK1 within cells.”

*Journal of Cell Biology 176: 89-100*

**Parental link to obesity**

Women who began their periods before the age of 12 are more likely to have children who also start puberty early and are overweight than children of mums who mature later. The finding is from the Bristol-based Children of the 90s ALSPAC study. Researchers led by Dr Ken Ong of the MRC Epidemiology Unit in Cambridge studied more than 6,000 children and looked for links between a mother’s age at puberty and obesity risk and her children’s growth. The results showed that mothers who went through puberty early tended to be shorter and fatter than other mums and, on average, gave birth to children who grew rapidly during infancy, became overweight in early childhood and started puberty earlier. This growth pattern appears to be passed on from mother to child making it likely that it is due to genetic factors. Other possible causes are behaviours that run in families – identifying these factors could help develop new ways of preventing and tackling obesity. Dr Ong said: “Knowing that rapid infancy weight gain, early puberty and obesity run together in families may help us identify which children to best target our efforts at right from birth.”

*Public Library of Science Medicine 4: e132*
Gene guns: improving a researcher’s aim

A gene gun is a tool scientists use to insert genetic information such as DNA or RNA into a cell. Handheld and roughly the size of a hairdryer, it was originally developed to create new strains of plants. Now, John O’Brien at the MRC Laboratory of Molecular Biology (LMB) has improved the accuracy of the gene gun to create a precision instrument capable of firing DNA into a single cell. His inspiration came from a retired policeman’s description of machine gun mechanics. The gene gun is powered by a pulse of helium which pushes its genetic bullet through a cell membrane and into the nucleus. Mr O’Brien modified the angle of the holes in the original gun that allow helium to escape, thus reducing the recoil that causes tissue damage. “By experimenting until I found the optimum angle for minimal tissue damage, I improved both the accuracy and penetration of the gun,” he said. The gun can now be used to insert DNA into smaller targets and deeper tissues. In the future, a further modified design might make it possible to deliver DNA vaccines into human skin or muscle cells without damaging them.

Nature Protocols 1: 1517-1521

MMR controversy impact on families of children with autism

Health professionals need to be aware of the negative effect the MMR vaccine controversy has had on some parents of children with autism, say researchers at the MRC Social and Public Health Sciences Unit in Glasgow. The team carried out focus groups with 38 parents of children who had been diagnosed with autism after the publication of Andrew Wakefield’s paper wrongly linking the vaccine to the development of the condition. They found that many of the parents whose children had received the MMR vaccine felt guilty that they may have caused or contributed to their child’s autism. Some also felt frustrated by health professionals’ lack of understanding of how the controversy had affected them, and some were anxious about making subsequent decisions about the vaccine for their children. The researchers said: “There is a need to promote greater awareness of the important role of health visitors in parental decision making. It is also essential that the latest scientific research findings are disseminated quickly to these parents and to health professionals advising parents on matters of vaccine safety.”

Archives of Disease in Childhood 92: 322-327

vCJD symptoms reversed in mice

Researchers at the MRC Prion Unit in London have shown that stopping the production of normal prion protein in the brains of mice with a disease similar to human vCJD reverses problems with memory and social behaviour induced by prion infection. In prion disease, including vCJD in humans, BSE in cattle and scrapie in sheep, ‘rogue’ prions are formed from naturally occurring prion proteins, which change shape and start to accumulate in the brain. Led by Dr Giovanna Mallucci, the scientists studied the effect of stopping production of these naturally occurring proteins on symptoms and progression of prion disease in mice. In the early stages of disease, infected mice began to have problems with memory and behavioural tests. However, mice which had the gene for normal prion proteins switched off experienced a reversal in these symptoms and recovered normal behaviour and the ability to learn and remember. Dr Mallucci said: “Our results have shown that early problems with brain function can be rescued in mice. The challenge now is to be able to detect early disease in humans and to develop treatments that can remove normal prion protein.”

Neuron 53: 325-335

HAVE YOU GOT STORIES LIKE THIS TO TELL?
We have just completed our annual exercise collecting research achievements – scientific advances, awards or notable public engagement events – from units and grant-holders. A selection will be included in our Annual Review, which goes out to the public, journalists, politicians and the science community. Watch out for a new system of collection. Instead of once a year, we will soon be inviting MRC researchers to submit achievements as they happen, and preferably in advance of publication in journals. We can then make the most of them in a timely way on our website, in our publications and press releases, and in response to government requests for information.
Research that could help fight antibiotic resistant bacteria has won the 2007 Louis-Jeantet Prize for Medicine for Dr Venki Ramakrishnan, joint head of the Structural Studies Division at the MRC Laboratory of Molecular Biology in Cambridge. The prize, worth over £200,000, is awarded annually to biomedical research scientists working in Europe. Dr Ramakrishnan said: ‘With so much excellent research being done in many labs, I feel lucky to have received this recognition and also thank the wonderful colleagues I’ve had over the years who made our research possible. The award will help us attempt some riskier and even more challenging projects.”

Dr John Rouse, a principal investigator in the MRC Protein Phosphorylation Unit at the University of Dundee, has been awarded the 2008 Colworth Medal of the Biochemical Society, the most prestigious award that a UK biochemist aged under 36 can receive. The focus of Dr Rouse’s research is understanding how cells recognise and repair DNA damage to prevent mutations and diseases such as cancer. Noting that seven past recipients have also been based in Dundee, Dr Rouse said: “This is a testament to the quality of biochemical research going on here”.

Hot on the heels of being appointed the 2007 Goulstonian Lecturer by the Royal College of Physicians in February, Dr Rebecca Fitzgerald was awarded the 2007 Sir Francis Avery Jones Research Medal by the British Society of Gastroenterology in March. A member of the MRC Cancer Cell Unit, she is researching the processes and molecular pathogenesis of Barrett’s oesophagus and oesophageal adenocarcinoma, also known as gullet cancer (see page 18).

Professor Robert Plomin has taken over the directorship of the MRC Social, Genetic and Developmental Psychiatry (SGDP) Centre at the Institute of Psychiatry (IoP) in London, while Professor Peter McGuffin acts as Dean of the IoP for three years. Professor Plomin has been deputy director of the SGDP Centre since 1994, following time at Pennsylvania State University, the University of Colorado in Boulder and the University of Texas in Austin.

Tracey Dobbs, who is studying for an EU-funded PhD at the MRC Radiation and Genome Stability Unit at Harwell, was awarded the 2006 University of Wisconsin Jack Fowler Award in January. The award recognises an outstanding junior investigator for exceptional work in radiation oncology, medical physics and/or radiobiology. Tracey is researching the biological consequences of ionising radiation exposure.

Dr Mary Muers of the MRC Molecular Haematology Unit has won the over-25 category of the Oxfordshire Science Writing Competition run by the University of Oxford. Her essay, entitled ‘Packing the World’s Smallest Suitcase’, detailed the intricacies of DNA packaging in cells.

Professor Peter Somogyi, director of the MRC Anatomical Neuropharmacology Unit in Oxford has been elected a member of the German Leopoldina Academy of Sciences. Founded in 1652, the Leopoldina Academy of Sciences is the oldest academy of natural sciences in continuous existence. It has a maximum of 1,000 members, including only 250 from outside Germany, Austria and Switzerland. Members are elected for demonstrating scientific excellence in one of 28 fields.

Three of the MRC’s research boards have new chairs. Professor Deborah Smith of the University of York’s Immunology and Infection Unit has taken over as Chairman of the Infections and Immunity Board, while Professor Paul Luzio of the Cambridge Institute for Medical Research is the new Chairman of the Molecular and Cellular Medicine Board. Professor Steven Holgate of Southampton General Hospital at the University of Southampton is Chairman of the Physiological Systems and Clinical Sciences Board. We would like to take this opportunity to say thank you and farewell to the three respective departing chairs for their hard work and dedication over the past few years: Professor Andrew McMichael, Professor Michael Wakelam and Professor John Saville.