UK Stem Cell Bank launch

On 19 May the UK Stem Cell Bank was officially opened for business by the Health Minister, Lord Warner.

The occasion also marked the announcement of the first cell line deposits – the UK’s first two embryonic stem cell (ES) lines, which have been independently isolated by researchers at King’s College London and the Centre for Life in Newcastle. Declaring the Bank open, Lord Warner remarked that it confirmed the UK’s position as a world leader in stem cell research and the Government’s commitment to capitalising on the latest scientific advances to benefit NHS patients.

The Bank is hosted by the National Institute for Biological Standards and Control, at South Mimms in Hertfordshire, and funded by the MRC and the Biotechnology and Biological Sciences Research Council (BBSRC). The first of its kind in the world, the Bank is responsible for storing, characterising and supplying ethically-approved, quality-controlled stem cell lines for research aimed at developing new treatments for human diseases and traumatic injuries. It will hold cell lines originating from embryonic, fetal and adult tissues. All applications to make deposits or to access banked stem cell lines will have to be reviewed and authorised by a high-level steering committee, chaired by Lord Naren Patel, before they can proceed.

“Stem cell research offers real promise for the treatment of currently incurable diseases. The Bank will ensure that researchers can explore the enormous potential of this exciting science for the future benefit of patients.”

Professor Colin Blakemore, MRC Chief Executive

Stem cell funding comes on stream

The MRC, the BBSRC, the Economic and Social Research Council, the Engineering and Physical Sciences Research Council and the Council for the Central Laboratory of the Research Councils, have announced a £16.5m investment in stem cell research. The cash, which was allocated in the 2002 Government Spending Review, will fund 57 multi-disciplinary projects from basic research, to work on clinical applications.

Some grants will generate fundamental biological insights into how stem cells work, while others are aimed at delivering new treatments for major diseases and disabilities. For example, Professor Ann Logan of the University of Birmingham will be exploring the ability of particular adult tissue cells to generate other cell types, for example blood, nerves and bone. Stem cell lines cultured in the laboratory, which can multiply and reproduce themselves indefinitely, offer the revolutionary potential to repair damaged and damaged body tissues by replacing them with healthy new cells.

Sheffield University will host a Human Embryonic Stem Cell Resource Centre, which is being set up to give UK researchers access to expertise, resources, facilities and training. The Centre will also develop technologies for working with ES cells, and a database and website to collate and disseminate technical information and techniques developed at the Centre and elsewhere.
Ethics and governance

As a responsible funding body, the MRC has a major role in maintaining the integrity of medical research, both in the UK and abroad. Read on to find out more...

Maintaining high standards of ethical conduct and governance in research is of paramount importance to the MRC. In seeking to achieve this goal, we aim to strike a balance between taking public concerns into account and ensuring that research vital to improving health is allowed to proceed within a robust regulatory framework.

**Stringent controls**
The MRC insists that no activity it funds can commence unless the necessary permissions are in place. In particular, research involving people, their tissues, and personal data must first be approved by an independent research ethics committee. The MRC can decide not to support work on ethical grounds alone even if already approved by an ethics committee. All research involving animals must adhere to the stringent regulations of the Animals (Scientific Procedures) Act, 1986. In 2001, the MRC set up the Centre for Best Practice for Animals in Research (CBPAR) to promote and disseminate advances in laboratory animal welfare. The Centre is to form the basis of a new National Centre for the Replacement, Refinement and Reduction of Animals in Research (See page 3).

Implementing statutory regulations and good practice guidance can be a challenge for researchers, which is why the MRC is running a project to support its Units in this area. The aim is to achieve sustainable and locally relevant ways for researchers to implement MRC standards, and to enable Units to work more closely with each other in this respect. A research governance network of Unit representatives is being set up to address researchers’ concerns, disseminate information and exchange experiences and ideas. For further details about the project contact: sarah.dickson@headoffice.mrc.ac.uk

**Influencing policy**
An external committee of experts has been set up to monitor emerging ethical issues and advise the MRC about how best to respond. The MRC is also a funding partner of the Nuffield Council on Bioethics. This independent body examines and reports on the ethical questions raised by recent advances in biological and medical research and has an international reputation for providing advice to inform policy makers and researchers. The MRC is working with the DoH, the Medical Healthcare products Regulatory Agency, trialists and others to provide clarity on implementing the ethical conduct of research in particular areas. The MRC views on the draft Human Tissue Bill – which largely reflects the MRC’s views and its own guidance on ethics of research involving human material derived from the nervous system, raises serious ethical issues and has been the subject of considerable public concern. The MRC has therefore updated its guidance in the area with interim guidance on ethics of research involving human material derived from the nervous system (2003). And the Government has responded to recent high-profile inquiries – Bristol, Alder Hey and Islaacs – by drafting new legislation designed to address uncertainties and inconsistencies in the current law on the removal, retention and use of human tissues. Consent will be the fundamental principle of the legislation, which seeks to establish a Human Tissue Authority to license regulated activities. The MRC has taken a close interest and participated in the pre-publication consultations. The Bill largely reflects the MRC’s views and its own guidance on human issue and biological samples for use in research (2001), which emphasised the need for patient confidentiality, consent and information. However, the MRC raised concerns about particular aspects of the original draft Bill with the Department of Health (DoH) and consulted others about their views. Their feedback was incorporated in a position statement – MRC views on the draft Human Tissue Bill – which considers the implications for medical research. The main concern was that legislation on the use of tissue remnants from diagnostic tests and operations could impose unnecessary bureaucracy and hinder important research. Other issues included provisions for giving and obtaining consent, public health monitoring, DNA analysis, licensing, and the make-up of the Human Tissue Authority. Following discussions with a wide range of interested parties, including the Wellcome Trust, and a meeting with Ministers to discuss these issues, changes to the draft Bill have recently been tabled as amendments. The MRC will continue to monitor progress with the Bill and provide further briefing as required. Scotland has a separate legislative process and the MRC has given its comments to the Scottish Executive.

**Human Tissue Bill**
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**Mental Capacity Bill and MRC guidance**
The MRC has also been following developments in the Mental Capacity Bill, which the Government published on 1 June. The Bill aims to give better protection and greater empowerment and autonomy to those lacking mental capacity. The MRC will be commenting on the Bill and will then update its own guidance – The ethical conduct of research on the mentally incapacitated (1991) – after the Act has been passed.

**Medicines for Human Use (Clinical Trials) Regulations**
The Medicines for Human Use Regulations, which transposed the EU Clinical Trials Directive into UK law on 1 May, have raised concerns in the academic trials community. The MRC is working with the DoH, the Medical and Healthcare products Regulatory Agency, trialists and others to provide clarity on implementing...
The 3Rs
- Replacement of animals with humane alternatives
- Refinement of procedures to minimise any pain, suffering and distress
- Reduction of animal numbers

MRC|network


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- Replacement of animals with humane alternatives
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New laboratory animal welfare centre

The MRC is to host a new National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs), with the MRC’s existing Centre for Best Practice for Animals in Research (CBPAR) forming the nucleus of the new Centre.

The Government has set up the NC3Rs on the recommendation of the 2002 report of the House of Lords Select Committee on Animals in Scientific Procedures and, following consultation with stakeholders, announced its formation in May. Acknowledging CBPAR’s established role as a central resource for the academic scientific community on all aspects of animal welfare, the Government decided that the new centre should use this valuable expertise as its foundation. Dr Vicky Robinson, currently Head of CBPAR, has been appointed Head of the NC3Rs, and it will have an independent Board chaired by Lord Leslie Turnberg.

CBPAR’s expansion into the NC3Rs broadens its remit to encompass industrial issues, including regulatory toxicity-testing. The MRC has increased its investment into the Centre, both for infrastructure and for funding research that advances the 3Rs, and the Biotechnology and Biological Sciences Research Council has doubled its contribution.

Ensuring that laboratory animals receive optimal welfare is critical, for scientific, legal and ethical reasons. While the NC3Rs’ ultimate aim is Replacement, it will be making every effort to minimise animal use and improve welfare for as long as research involving animals remains unavoidable.

The NC3Rs mission
To advance and promote the 3Rs in research and testing licensed under the Animals (Scientific Procedures) Act 1986, the NC3Rs will:

- Develop a UK strategy for the implementation of the 3Rs
- Support high-quality research that advances the 3Rs
- Promote a coordinated approach to 3Rs research
- Provide advice and guidance on the 3Rs and animal welfare to the UK scientific community
- Support the scientific community’s commitment to best practice in all aspects of laboratory animal science and welfare
- Work with regulators on the acceptance of alternative methods in regulatory toxicology

“This is a really exciting opportunity. I’m delighted that the Government has recognised the work that CBPAR has done to promote the 3Rs. I’m looking forward to expanding this work to continue to benefit animals and science.”

Dr Vicky Robinson, Head, NC3Rs
Integrative physiology

The first of a series of joint MRC/Wellcome Trust workshops on strategically important research areas took place at the Institute of Physics in London on 6 and 7 May. Network was there to bring you the full story.

MRC CEO Colin Blakemore and Dr Mark Walport, Director of the Wellcome Trust, have initiated the workshops to foster closer working between the two organisations in areas of mutual interest. Opening the meeting, Colin Blakemore emphasised the benefits of working together, "The interests of both major funders of UK biomedical research overlap enormously and partnership is vitally important for the future of medical research. Joint working will enable us to punch above our weight to achieve our strategic objectives. This must involve not only the Wellcome Trust, but all the research charities, universities and the Government."

Pulling together

The theme of this first workshop was integrative physiology – research aimed at explaining how a multitude of biological processes and structures are assembled and work in living organisms. Integrative physiology has natural overlaps with biological studies at the levels of organs, systems and whole animals. It aims to combine these levels of analysis with research into molecular and cellular mechanisms to investigate both normal function and the physiology of disease processes.

Integrative physiology will be essential to understand the role of genes in regulation and disease, and to translate molecular science into clinical benefits. But although its strategic importance to UK science is widely accepted, the gap between molecular and physiological strands of research has widened over the last two decades. While spectacular advances in molecular and genetic research are providing unprecedented opportunities to study molecular, genetic and environmental influences on health, whole-animal physiology has become unfashionable, under-funded and neglected. Attributing the decline in part to a shortage of expertise in research involving animals, Colin Blakemore warned that the great successes of molecular biology would languish without skilled researchers in integrative physiology. He said, "It is in everyone’s interest – academic, clinical and industrial – to consolidate and rebuild integrative physiology research in the UK. The pharmaceutical sector in particular needs trained physiologists and pharmacologists to help to turn scientific knowledge into advances in prevention, diagnosis and treatment."

The workshop had two main aims. Firstly, to advise the MRC and the Wellcome Trust on a joined-up approach to strategy development, priority-setting and capacity-building relating to integrative physiology research and training; and secondly, to bring together molecular, physiological and clinical scientists to strengthen existing networks and establish new ones.

Rather than attempting to cover the whole field, the workshop focused on three thematic examples in humans and mammals – the kidney, the lung and the cardiovascular system. Experts from the UK, Europe and the US were invited to showcase leading science in these areas. They then participated in follow-up sessions to identify the factors that help and hinder this kind of research, to scope promising areas and future challenges, and to discuss how best to consolidate and strengthen integrative physiology research in the UK.

Closing the meeting, the Wellcome Trust’s Director Mark Walport said that although there would be no ring-fenced money for integrative physiology, the Trust and the MRC would seek to encourage high-quality research proposals and work together to enhance career prospects in the field.

What’s it all about?

Integrative physiology research aims to answer questions about how living organisms work by investigating the complex assembly of biological processes and structures that make up organisms at all levels, from molecules and cells to tissues, organs, systems and the whole animal.

"An integrative approach is crucially important to understanding the complex interactions between genetic make-up, environment and lifestyle that influence health and disease, and to translating this understanding into clinical benefits."

Colin Blakemore, MRC Chief Executive
**International**

Professor Sarah Rowland-Jones has been appointed Director of Research at the MRC Laboratories in the Gambia. She joins Unit Director Dr Tamara Corrall and Director of Operations Mark Radford on the Executive Management Board.

“I’m very excited about the past, the Unit has made a major contribution to international health over the years and I look forward to joining my new colleagues to continue this important work.”

Professor Sarah Rowland-Jones

Professor Rowland-Jones was previously Director of the Oxford Centre for Tropical Medicine, and a group leader in the MRC Human Immunology Unit (HIU) in Oxford, where she has been studying the role of cellular immune responses to viral infections, particularly HIV, since 1989. Her group is currently focusing on immune responses to HIV in highly-exposed but apparently uninfected people, most notably sex workers in Nairobi and the Gambia, and more recently in infants exposed to HIV at birth and through breast-feeding.

An HIV vaccine designed by Professor Andrew McMichael, HIU’s Director, to stimulate similar immune responses to those seen in the uninfected sex workers is currently being tested in clinical trials in Nairobi and Oxford.

**Research centre news**

**NIMR Task Force update**

The Task Force set up to advise the MRC’s Council on the future of the National Institute for Medical Research (NIMR) held its final meeting on 21 June. For seven months, the Task Force has conducted extensive inquiries and consultations, both in the UK and abroad, about options for the NIMR’s future. At the meeting, the Task Force members evaluated the preferred options that they had identified earlier and drew up recommendations for consideration by the MRC’s Council at its meeting on 29 July. Alongside this evaluation, the Task Force took into account views submitted by the wide range of people and organisations that responded to its recent consultation on the preferred options.

**Find out more online**

For the latest news from the Task Force visit

www.mrc.ac.uk/about-nimr_taskforce_bulletin

Consultation document (the consultation is now closed), including the Task Force’s assessment criteria, membership and terms of reference


**New Mary Lyon Centre offers state-of-the-art facilities**

On 30 June Lord Sainsbury of Turville, Minister for Science and Innovation, opened the MRC’s Mary Lyon Centre in Harwell in Oxfordshire. Named in honour of Dr Mary Lyon, who has worked at Harwell since 1955, the Centre has been built to house specially-designed mouse-phenotyping facilities and to create a centre of excellence in mouse anatomy, physiology and pathology. Although it will primarily support research carried out at Harwell by the Mammalian Genetics Unit and the Radiation and Genome Stability Unit, the Mary Lyon Centre will also support mouse research in the wider UK community.

In addition, one-third of the space in its world-class facilities will be made available to external researchers. Professor Steve Brown, MGU’s Director, said, “One of the major challenges for the 21st century is to determine the function of all genes in the mammalian genome and their role in human disease. The Mary Lyon Centre with its state-of-the-art facilities and expertise will make an enormous contribution in achieving this goal.”

Headed by Professor Bob Johnson, the Mary Lyon Centre can house up to 65,000 mice and offers a range of services including basic animal husbandry, transgenesis and gene-targeting, phenotyping, mutagenesis, pathology and histology, embryo and sperm archiving and bioinformatics support. As the welfare of the mice is of paramount importance, the building is purpose-designed to meet the highest possible standards of animal welfare.

**Opportunities**

The MRC offers support for talented individuals who want to develop research careers in the biomedical sciences, public health and health services. We have a comprehensive range of personal award schemes each tailored to particular stages in clinical or non-clinical careers. For further details visit www.mrc.ac.uk

**Board applications 2004/05**

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**MRC awards**

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**Calls for proposals**

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*Deadline for expression of interest, without which a full application can not be submitted.

**Department of Health Healthcare Genetics Visiting Fellowships**

These new fellowships are aimed to promote learning exchange in healthcare or academic settings that will improve the application of genetics to healthcare for the benefit of NHS patients. The scheme will support visits of up to three months for English health professionals going abroad, and for foreign leaders in the field invited by host institutions to come to England. The first awards will be for visits during 2005.

To express your interest, email: fellows@headoffice.mrc.ac.uk by 30 July 2004.

The application deadline is 10 September 2004.

For further details and application packs, visit www.mrc.ac.uk/funding-other_awards
Unit profile: The Toxicology Unit, Leicester

A century and a half after Claude Bernard’s studies of carbon monoxide poisoning first revealed the function of haemoglobin, toxicology continues to yield fundamental biological insights. Network visited the MRC Toxicology Unit at Leicester to find out about their contribution…

The MRC Toxicology Unit is one of the MRC’s longest-standing research centres. It was conceived during the Second World War by a few enlightened people who foresaw that industrial, technical and medical developments might expose people to new kinds of potentially hazardous chemicals, with unpredictable consequences. The Unit was originally sited at Porton Down in 1947 under the Directorship of John Barnes, with Norman Aldridge as the only member of staff. In 1950 it moved to Carshalton, where it flourished as the world’s leading centre for toxicology research and inspired other countries to create similar establishments.

The Unit’s success was largely due to Aldridge’s realisation that studying how chemicals exerted their effects at all levels, from the whole animal right down to individual molecules, would help scientists to understand the toxicity of related compounds and allow them to make generalisations about the underlying biological processes. This pioneering multi-disciplinary approach aimed at investigating fundamental mechanisms reaped rewards over the following decades and led to understanding of the toxicity of environmental pollutants including pesticides and solvents. These successes stimulated demand for studies into the toxicology of specific compounds, for example to establish reference values for risk assessment, and a gradual shift towards more applied research.

In 1991, the Unit was transferred to purpose-built premises at the University of Leicester to strengthen its academic ties and enhance both basic and applied strands of research. While it continued to assess the dangers and effects of environmental chemicals including pesticides and solvents, it also pursued new lines of fundamental research such as genetic susceptibility and mechanisms of cell death, and the toxicology of various drugs including certain anti-cancer agents.

Major restructuring in 2001 saw the arrival of the Unit’s current Director, Professor Pierluigi Nicotera, with a vision to revitalise toxicology to reflect its origins as a mechanistic science. He believes that over the years the application of toxicology to advance biomedical science has become neglected at the expense of meticulous cataloguing of the toxic effects of particular compounds on diverse biological processes, often driven by social and political pressures. While acknowledging that this work is important, Professor Nicotera thinks it is better left to dedicated businesses and government agencies, and that the Unit should focus on answering fundamental questions that can help to solve a variety of health problems. He told Network, “Diverse organisms from the fruit fly and nematode worm right up to humans often show common patterns of responses to toxins and injury. By studying these interactions within individual cells and organs we can gain fundamental insights into the underlying biology that can help us understand the potential adverse effects of a wide variety of substances. As well as revealing the mechanisms of known toxins, this knowledge can be extrapolated to other human health problems and could be valuable in anticipating and assessing risks, giving us the flexibility to react quickly to emerging health threats.”

Matters of life and death

Cell dysfunction and death are central to both toxicology and human disease. Research into the causes and mechanisms involved is the common thread running through all of the Unit’s research. Its scientists are looking at how cells, tissues and simple organisms react to different types of injury triggered by toxic agents as well as by endogenous molecules. The research falls into three broad areas: cell injury in the nervous and immune systems, mechanisms of cell death and resistance in cancer, and common patterns of gene and protein activity in toxicity and disease.

Cell death is vital to healthy life. Although the overall number of cells in a fully grown organism shows little variation, hundreds of thousands of new cells are made every day to replace old or damaged ones, and hundreds of thousands must die to maintain the status quo. The fate of most of these cells is self-destruction through a natural form of cell death called apoptosis. This is key to normal development and tissue maintenance. Inappropriate apoptosis upsets this finely-tuned balance and is important in diseases of the cardiovascular, immune and nervous systems, and in cancer.

Apoptosis explained

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function. For example, excessive cell death plays a role in neurodegenerative diseases, including Huntington’s and Alzheimer’s. Research into preventing cell death may therefore provide valuable clues to treating these devastating conditions and other neurotoxic syndromes. Cancer and some diseases of the immune system, on the other hand, often result from a failure of cells to die at the end of their natural life. Learning how to re-activate or trigger cell death in cells that are proliferating uncontrollably could help to develop anti-cancer drugs. Understanding the complex feedback systems that balance cell proliferation and cell death, and predicting the overall consequences of alterations in these processes are key goals of much of the Unit’s research. The effect of drugs on cell death regulation is also part of these studies. Cholesterol-lowering statin drugs have neuroprotective properties, and Toxicology Unit researchers are investigating the underlying mechanisms and the possible side-effects of long-term statin treatment. One group is conducting research, in the lab and in patients, into the effects of statins in the immune system. Another is investigating the modulation of cell death regulatory proteins by statins in neurodegenerative disease and stroke.

Apoptosis breakthrough
This year, research led by Deputy Director Professor Gerry Cohen achieved a fundamental breakthrough in the understanding of apoptosis. The process is dependent on a cellular structure called the proteasome, which controls cell fate by regulating the balance of short-lived intracellular proteins. Normally, proteins that are no longer needed are tagged to mark them out for destruction by the proteasome. But in apoptosis, enzymes called caspases are released and prevent the proteasome from recognising the markers. As a result the cells own apoptosis-promoting proteins accumulate and eventually trigger the in-built cell death programme. Professor Cohen told Network, “This new research takes us a step closer to understanding how cells die. The challenge now is to use this knowledge to work towards finding new drugs and treatments for the many common diseases and conditions which occur when cell death goes wrong.”

Well connected
The Unit’s links with the University, local hospitals and research groups worldwide are vitally important to its success. There are close ties with the university departments of pharmacology, biochemistry, pathology, genetics, and several Unit staff have honorary university appointments. The Units teams work side-by-side with university research groups in areas of shared interest, promoting a mutually beneficial two-way exchange of expertise in molecular biology and toxicology. And with five clinicians including the Director on the staff, the Unit has the expertise necessary to recognise potential clinical applications arising from its research. Research into the causes of chronic lymphocytic leukaemia in collaboration with the University Hospital of Leicester NHS Trust has led to the development of a new drug treatment, which the Unit is planning to test in clinical trials working with the University and industry. Professor Nicotera also emphasises the importance of maintaining links with the public – for example, the Unit is holding a public open day this summer which will include demonstrations of its research.

Back to the future
Three years after Professor Nicotera’s arrival, the Toxicology Unit is in good shape to continue its distinguished tradition of world-leading research. Under his leadership the Unit has expanded to 115 staff, and has become a major and internationally respected centre for studies related to cell death. Professor Nicotera told Network, “We have made substantial progress over the last three years, and good cohesiveness and interaction between our research groups is already bearing fruit. Several teams are close to making new fundamental contributions.” With a creative, attractive and well-resourced research environment, a critical mass of talented researchers and a string of major publications in the pipeline, there is a tangible air of excitement about the Unit’s prospects for the future.

Find out more online
www.le.ac.uk/mrcntc/
**Elderly not an NHS burden**

The MRC Health Services Research Collaboration (Bristol) has found that the use of acute hospital services does not increase with age, challenging the widespread perception that older people place a huge burden on UK health services. The Bristol University-based team analysed the records of more than quarter of a million people who died in hospital between 1999 and 2000 to look for any variation in the age of those receiving acute NHS care in the three years before they died. The figures revealed that these people did not tend to be older and that in fact hospital admissions over this period decreased with age, with a stable average length of stay among people over 45 years old. The researchers explained that while older people account for a high proportion of acute health care resources, this is because they are nearing the end of their lives and not because their treatment is any more expensive. The finding concurs with others showing that the greatest acute care costs are in the final years of life, regardless of age. The work has important implications for understanding the use of acute hospital resources and for distinguishing the costs of dying from the costs of ageing.

*BMJ* 328: 1288-1290

**A shoulder to cry on protects heart patients**

An MRC/British Heart Foundation (BHF) study has shown that patients who are supported by another person after a first heart attack have reduced risk of suffering another one. The study, led by Professor Francis Creed and Dr Chris Dickens at the Manchester Royal Infirmary, looked at 600 heart attack victims with an average age of 60, nearly three quarters of them men, to investigate the role that personal experience, depression, lifestyle and a person’s support network play in heart attack risk. Unsurprisingly, older age and previous history of heart disease increased the likelihood of having a further attack, but the risk was also found to be higher among those who did not have a close confidant. After taking the severity of the attack and other risk factors into account, those who had a close relationship with a partner, relative or friend were half as likely to have a second attack as people who did not. While they found no evidence for a direct link with depression, the authors argue that treating depression and improving social support have an important part to play in cardiac prevention.

*BMJ* 328: 1288-1290

**Surgery and statins slash stroke risk**

Patients with substantial narrowing of the carotid artery – one of the main blood vessels supplying the brain – are known to be at increased risk of stroke. However, there has been medical uncertainty about whether the long-term benefits of surgery to remove the fatty deposits obstructing the artery outweigh the risks associated with the procedure. Now a large-scale international trial co-funded by the MRC and The Stroke Association has shown that this surgery, which is called carotid endarterectomy, can halve stroke risk in these patients. The trial compared immediate surgery for patients who had substantial narrowing of their arteries with deferred surgery. Over 3,000 patients in 126 hospitals in 30 countries took part. After five years the risk of stroke in people aged 75 and under in the group who had immediate surgery was cut from 12 to six per cent. Alison Halliday, a consultant vascular surgeon at St. George’s Medical School in London, led the trial. She said, “It’s clear from our trial that immediate surgery is the best option for some patients with severe narrowing of the carotid artery. How much this change practice across the health service will depend on how long the benefits last. We’re now going to follow these patients for another five years to find out.”

The latest results from the MRC/BHF Heart Protection Study show that in addition to preventing heart attacks in high risk patients, cholesterol-lowering statin drugs also cut the risk of blood-clot induced strokes by up to a third.

*Lancet* 363: 1491-1502

**Breastfeeding benefits confirmed**

Breast is definitely best! That is the conclusion of an exhaustive 20-year study by MRC and Institute of Child Health scientists to determine the long-term health effects of early human nutrition. Prompted by findings in animals, Dr Atul Singhal and Professor Man Lucas, conducted the first ever randomised trial to assign babies to different diets and monitor their health as they grew up. They compared the health of adolescents who were fed on breast milk as babies with others who were fed formula milk with varying nutritional value. The results showed that formula-fed babies are more prone to developing obesity, diabetes, high blood pressure and elevated cholesterol levels, which increase the risk of heart disease and stroke. This is because nutrition enriched formulas prompt these babies to grow abnormally fast compared to their breast-fed counterparts, altering their biology irrespective of birth-weight, the faster the growth, the greater are the health risks. Dr Lucas said, “The evidence is very strong and supports a clear message. Slower growth as a baby reduces the risk of heart disease and stroke in adult life and the best way to achieve this is to breastfeed.”

*Lancet* 363: 1571-1578

**Huntington’s drug hope**

Cambridge University researchers funded by the MRC and the Wellcome Trust have found that a drug used in humans to prevent organ transplant rejection slows the onset and progression of pathology and clinical signs in animal models of Huntington’s disease. This fatal, and currently incurable, inherited neurodegenerative disease is caused by the toxic effects of mutant huntingtin protein that accumulates in the central nervous system, leading to depression, loss of muscle control, dementia and death. Research led by Dr David Rubinsztein in the Department of Medical Genetics showed that the drug rapamycin reduces mutant huntingtin levels in cell, mouse and fly models by accelerating its breakdown. Dr Rubinsztein said that since the drug is intended for long-term use this could be a very important step towards treating people diagnosed with Huntington’s. However he cautioned that the risk of side-effects would have to be weighed against the drug’s potential benefits, adding that further research will be performed as quickly as possible to provide the information that will help inform the design of human trials.

*Nature Genetics* 36: 585-595
New Dynamics of Ageing

The world is witnessing a rapid growth in its population of elderly people. In the UK the number of citizens over pension age is set to rise to 14 million by 2030. In the decades to come unprecedented numbers of older people will face the risks of disease, frailty and dependence. The need to understand the factors that promote health, independence and social inclusion of older people, and those that lead to disease, disability and inequality has never been more urgent.

While there are strong research communities in ageing and related fields, and medical advances continue to reduce disease rates and to improve peoples’ quality of life into old age, progress has been uneven. A combined and innovative interdisciplinary effort is the only way to meet the challenges of ensuring older people’s health and well-being and improving the management of age-related conditions. This is the principal aim of an ambitious new cross-Council research programme – New Dynamics of Ageing – led by the Economic and Social Research Council (ESRC) in partnership with the Engineering and Physical Sciences Research Council, the MRC and the Biological and Biotechnology Research Council. Professor Alan Walker of the University of Sheffield has been appointed to direct the programme.

The programme’s central objective is to gain a better understanding of the dynamic interplay between the effects of ageing and people’s changing technological, social, biomedical, economic, physical and geographical environments. A call for proposals is expected to be announced soon.

New Dynamics of Ageing builds on the work of the ESRC’s own highly successful Growing Older Programme and the National Collaboration on Ageing Research, a cross-Council initiative designed to promote interdisciplinary research on ageing. It has also been heavily influenced by the Government’s EQUAL (Extend Quality Life) initiative, the Foresight Ageing Population Panel report The Age Shift: Priorities for Action, and the European Forum on Population Ageing Research.

Priority themes
- Ageing well across the lifespan
- Ageing and its environment
- Innovative approaches to interdisciplinary research

MRC Council and research board appointments

The Science and Innovation Minister Lord Sainsbury has announced new appointments to the MRC’s Council. The new members, who will begin service on 1 August, are Professors Andrew McMichael, Michael Wakelam, Carol Dezateux and Herbert Sewell. Current Council members Professor Genevra Richardson and Professor Alan North have been reappointed. The outgoing members are Professor Richard Denton, Professor Ian Maclellan, and Professor Nancy Rothwell, who complete their terms of office in July 2004.

Professor Andrew McMichael, who will chair the new MRC Infections and Immunity research board, is currently Director of the Weatherall Institute of Molecular Medicine, University of Oxford, and honorary Director of the MRC Human Immunology Unit, Oxford. An internationally renowned scientist, he has played a major role in developing a new anti-HIV vaccine currently undergoing clinical trials in Africa.

Professor Michael Wakelam replaces Professor Ian Maclellan as chair of the Molecular and Cellular Medicine research board. He has already served on other MRC committees and advisory groups, and is Chair of the Career Establishment Grants and New Investigator Awards panels and a member of the Monitoring and Evaluation Steering Group. He is currently Professor of Molecular Pharmacology in the Cancer Research UK Institute for Cancer Studies at the University of Birmingham, where his research interests include cell signalling in normal cells and defects in diseases such as cancer.

Professor Carol Dezateux is incoming chair of the MRC Training and Career Development Board and replaces Professor Richard Denton. She is currently head of the centre of paediatric epidemiology and biostatistics at the Institute of Child Health, University College London. Her research addresses early life influences on child health and the effectiveness of screening and other clinical and public health strategies to improve the health of children. She currently chairs the MRC Autism Research Strategy Initiative.

Professor Herb Sewell is currently Pro-Vice Chancellor and Professor of Immunology at the University of Nottingham. He is also a member of the Nuffield Council on Bioethics and is a Commissioner for the UK Medicines Commission. His research interests include the studies of allergic disease, focusing on the biological properties of allergic substances and the body’s response to them.

From August 2004, Professor Alan North will chair the MRC Neuroscience and Mental Health board, replacing Professor Nancy Rothwell. In July he becomes Vice-President of the Faculty of Life Sciences at the University of Manchester. Professor North’s main research interests are in the areas of physiology, pharmacology and neuroscience at the molecular and cellular level.

Professor Genevra Richardson, who is a member of the Government’s Animal Procedures Committee, will chair the MRC’s ethics group on the ethics of research involving human participants or tissues and personal information.
Microarrays are powerful tools, allowing rapid analysis of tens of thousands of genes at a time. A single experiment can provide information about the activity of all 30,000 or so human genes. Microarrays enable researchers to find out which genes are active in tissues at different times and to compare diseased and healthy samples. For example, they can be used to show the genetic differences between cancer cells and normal cells, or which drugs might best suit patients with particular genetic make-ups. In a clinical setting, distinctive patterns of gene activity can be used to define the health status, age and origin of a sample. Microarray data are already having an increasing impact on areas as diverse as clinical diagnosis, drug screening and environmental testing.

Database development for basic science and the clinic

Microarray experiments generate enormous quantities of data that must be systematically annotated and stored in a computer database before it can be used for large-scale analysis. A major focus of the Centre’s activities is developing a new database – the microarray data-mining resource, or MMIR for short – custom-built to meet these requirements. The idea is that as data accumulate, researchers and clinicians will be able to compare their results with data that other people have already generated. This would be impossible without widely adopted standards for microarray data, which the Centre has been instrumental in developing. New funds from the Department of Health are now allowing MMIR to be adapted for clinical use. The long-term goal is to build a resource that combines microarray and clinical data and can be used for patient management, diagnosis and assessment across a range of medical specialties. These are the beginnings of a new era in tailoring medicine to the individual patient.

Patient power

In addition to the technical challenges, patient confidence and involvement are crucial to the success of this venture. A Consumer Advisory Group, chaired by Sarah Riddell, non-executive director of the Hammersmith Hospital NHS Trust, has been set up to represent the patient perspective. The Group ensures that patients are properly informed and consulted, and that their views are respected in the development and management of the database. As Sarah points out, “It is only through informed collaboration that genomics-based medicine can be taken forward, for the benefit of patient care.”

Find out more online
http://microarray.csc.mrc.ac.uk/
The ESRC/MRC Innovative Health Technologies Programme

New health technologies such as genetics, imaging and telemedicine are transforming medicine. They are rapidly changing its vocabulary and practice, and the way patients, clinicians and policy-makers engage with it. And as medical research grows ever more sophisticated it also gets more complicated, with important implications for clinical diagnosis and service delivery. While new technologies in areas such as reproductive diagnostics, cancer care, mental illness and screening for genetic disorders increase understanding of disease and the body, the hidden complexities they reveal can simultaneously create greater uncertainty in both diagnosis and prognosis.

These developments present both an opportunity and a challenge, and understanding them is the motivation behind the Innovative Health Technologies (IHT) Research Programme (2000-2005). Jointly funded by the Economic and Social Research Council (ESRC) and the MRC, and run from the University of York, this £5m initiative supports 31 projects involving 140 researchers from the social and clinical sciences.

In parallel with assessing the impact of technological progress, the IHT Programme is mapping the ways in which more and more people are managing their health through non-clinical routes such as the Internet. This partly because of new uncertainties, but also because of the drive towards self-managed care. One of the Programme’s key themes is working out how to balance the growing technical sophistication of, and demand for, evidence-based medicine with more flexible, person-centred health care.

Emerging results

Areas that the Programme has recently explored include: the way in which brain-imaging technologies used to investigate mental illness redefine its meaning for patients and clinicians; how the application of new technologies to end-of-life care has raised new questions about palliative care; and how patients’ responses to genetic testing shows growing anxiety, even when the results are ‘good news’. Summaries of these and other findings will be published in 2005, in two major volumes about the Programme.

Networking

The Government’s recent White Paper on genetics – Our Inheritance, Our Future – shows that it is keen to embrace new technologies. Furthermore, the 2003 IHT annual conference, which focused on the implications of genetics and informatics, attracted strong Department of Health (DoH) participation. The Programme is now forging new informatics research links with the DoH and the Engineering and Physical Sciences Research Council, while the ESRC’s other major genomics investments through its four Genomics Centres provide important links within the wider UK social science research community. On 8, 9 and 10 July, the Programme is holding workshops in Manchester on medical innovation and its application, and on pharmaceutical research and development in conjunction with GlaxoSmithKline. International symposia in the US and Europe are also planned.

Professor Andrew Webster, Director, ESRC/MRC Programme on Innovative Health Technologies University of York

Find out more online

The IHT’s findings are now being published on the Programme’s web site, along with news of related research, reports and policy initiatives in the field.

www.york.ac.uk/reu/iht

Microarray Gene Expression Data Analysis: A Beginner’s Guide

This useful guide to designing and analysing microarray experiments is aimed at graduates and researchers in bioinformatics and the life sciences. It is also suitable for statisticians interested in current approaches to studying gene expression. In addition to emphasising key concepts and principles – simplifying the mathematics wherever possible – it covers some of the tools that are available from non-commercial sources.

Blackwell Publishers, £34.99, ISBN 1 405 10682 4

www.stemcellforum.org

This global resource developed by the MRC for the International Stem Cell Forum (ISCF) contains the latest information on key topics related to stem cell research: legislation and other policy developments; new research; training opportunities; workshops; job vacancies; conferences; and international news. It will also contain the results of ISCF initiatives, including a new Stem Cell Registry in early 2005.

Events diary

BioScience2004

Hosted by the Biochemical Society, BioScience2004 has experts from around the world speaking on the science of life. Key topics include body fats in health and disease; repairing DNA; immunity; and issues of public concern such as GM crops and use of human tissue in research.

Professor Colin Blakemore, MRC Chief Executive, will give the Opening Address on Sunday 18 July, and during the weekend children and adults can join in amazing fun experiments at the Glasgow Science Centre.

Scottish Exhibition and Conference Centre, Glasgow, 18-22 July

Thinking Science

Making Art

This summer term Dr Lizzie Burns – creator of the MRC Medical Research Revealed exhibition – has been holding workshops at 14 Exeter junior schools. She talked to 8-11 year olds about the human brain and then each child painted his or her interpretation of brain cells as part of a class collage.

Infowatch

"Taste"

St Nicholas Catholic Combined School, Exeter

The entries will be displayed at this year’s BA Festival of Science, at Exeter University from 6-10 September. Prizes for the best paintings will be awarded by a panel of judges including MRC Chief Executive Colin Blakemore. The exhibition will then be displayed at Exeter Cathedral from 11-25 September. To find out more, visit www.the-ba.net/festivalofscience
MRC people

Sir John Skehel, Director of the MRC’s National Institute for Medical Research, has won the 2004 Ernst Chain Prize. This annual prize was launched in 2003 by Imperial College London to celebrate scientific excellence – in Sir John’s case, major contributions to virology over the last three decades. Sir John led research that revealed how the flu virus latches onto and infects a cell, and went on to reveal how it evokes to evade the immune system. His discovery that other viruses, notably HIV, infect host cells in similar ways has informed the design of antiviral drugs used worldwide. Most recently, his team showed that the 1918 flu, which caused the world’s worst ever flu epidemic, could have been caused by a bird flu virus that jumped the species barrier to humans. Dr Ralph Kohl, of the Kohl Foundation which funds the prize, presented the £10,000 award and a commemorative medal to Sir John in a ceremony at Imperial College on 16 March.

MRC researcher Dr Mary Lyon, based at the Mammalian Genetics Unit at Harwell, has won the 2004 March of Dimes prize in Developmental Biology. The March of Dimes is a US voluntary agency working to prevent birth defects and infant mortality, and awards the prize to scientists whose work has significantly advanced scientific understanding in the field. Dr Lyon discovered in 1961 that in the very early female embryo, one of the two X-chromosomes in each cell is ‘switched off’ to give the correct working dose of X-linked genes. X-inactivation, or ‘ Lyonisation’, was the key to understanding many inherited birth defects and diseases, including haemophilia, Duchenne muscular dystrophy and fragile-X syndrome, which are caused by X-chromosome gene defects. Along with her $250,000 prize, Dr Lyon received a silver medal modelled on the Roosevelt dime in honour of the US President who founded the March of Dimes in 1938.

Dr Rebecca Fitzgerald, a group leader at the MRC Cancer Cell Unit (Cambridge), has won the Westminster Medal for Excellence at the annual awards ceremony of Science, Engineering and Technology for Britain. This organization aims to nurture, encourage and promote younger researchers, and to give them a chance to present their work at high-profile events. Among fierce competition and a record number of entries, Rebecca’s poster describing her research on the early diagnosis and prevention of oesophageal cancer won through to scoop first prize. She was presented with the medal and £1,000 prize money by Dr Malcolm Skingle of award sponsor GlaxoSmithKline, at a House of Commons reception for competitors on 5 March.

At the International Conference on Microbicides in March, Dr Alan Stone – Head of the MRC AIDS Secretariat from 1990 to 1996 – received a Lifetime Achievement Award from HRH The Princess Royal on behalf of the world-wide microbicides community, in recognition of his outstanding contribution to the field of microbicides research. At the MRC, Dr Stone initiated a research programme to develop anti-infective vaginal microbicides to protect women and their partners against the spread of HIV and other sexually transmitted diseases. He now chairs the International Working Group on Microbicides and serves on committees and panels concerned with microbicide development, including the Management Board of the MRC/Department for International Development (DFID) microbicides Development Programme. Dr Stone told Network, “The UK’s Microbicide Development Programme is at the cutting edge of efforts to create these urgently needed HIV prevention products which, unlike the condom, will be under the woman’s control. Credit must go to the MRC for recognising the importance of this line of research in the early 90s, and to DFID for their continued support of this work.”

Dr Kim Graham of the MRC Cognitive and Brain Sciences Unit has won the Paul Bertelson award of the European Society for Cognitive Psychology (ESCoP). The award honours scientists who have made an outstanding contribution to the field early in their career. As winner, Dr Graham is invited to present the award lecture at the next ESCoP conference in Leiden in 2005.

Your feedback please

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

We hope you find Network interesting and informative, and are very keen to receive feedback from our readers. If you have any comments, including suggestions for new features that you would find useful, please let us know. Just email: newsletter@headoffice.mrc.ac.uk

MRC Network is produced by the MRC Publications Team and is available in print and in downloadable pdf format at www.mrc.ac.uk

Mary Lyon (far right)