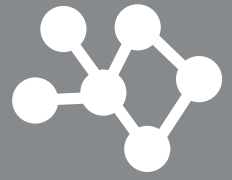


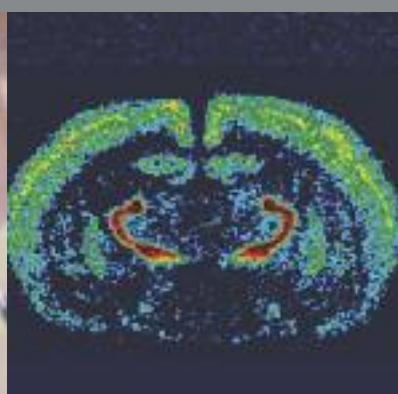


annual review 08/09

medical
research
scotland



FUNDING A HEALTHIER FUTURE



foreword from the Patron



BUCKINGHAM PALACE

I am pleased to introduce the *Annual Review* of Medical Research Scotland for the year 2008-09. I have watched its progress during this my first year as its Patron and have been interested to learn more of both the excellent research work it supports and also the progress made by many of those whom it has supported in the past. I look forward to meeting some of them in Edinburgh in the summer.

These are difficult financial times for all charities which rely on donations and investment income to fund the research so urgently required to meet the global healthcare challenges facing us all. This is particularly the case for Medical Research Scotland, which is committed to supporting those on whom the future quality of the country's research base depends.

I am confident that, with the proper support, Medical Research Scotland will ensure that it can continue to make a difference to Scotland, its early-career researchers and thus the health of the wider population.

Her Royal Highness The Princess Royal

chairman's introduction



This year I stand down as Chairman of Medical Research Scotland and my report is therefore slightly more personal than it would normally be. When I was invited to Chair what was then The Scottish Hospital Endowments Research Trust (an NDPB) in 2001, I had little concept of what the job entailed and certainly little idea of the time commitment.

It has been an extremely busy 8 years with many changes. We celebrated 50 years of supporting medical research in Scotland; we became a fully independent charity; we changed our name to Medical Research Scotland; our grant applications, reviews and reports are now in a fully automated 'online' format; we increased our grant funding to £150,000 over 3 years; we instituted a Research Open Day where Members and grantholders meet to discuss their research and, latterly, we have been privileged to receive the patronage of Her Royal Highness, The Princess Royal. An exciting few years and hopefully I leave with Medical Research Scotland well placed to take on all the challenges of the next several years.

What has not changed is our commitment to supporting young people as they start out in their careers in medical research in Scotland. Whether in medicine or in basic science, it is clear that what we do in funding high-quality research is vital in the progression of careers. To me, that has been the greatest privilege of being Chairman of this charity. To hear about and see young clinicians and scientists getting ahead in research and in their chosen fields brings enormous satisfaction. A fair proportion of my 'day job' in my 40 years in medical research has been in the supervision of PhD and MD students and I have had a lifelong commitment to the support of young people in this immensely satisfying career. What could be better than knowing that what you do is helping to improve health care and treatment?

The world has been hit by an economic crisis the likes of which have been unknown in our time. Consequently our investments have significantly reduced in value and although up until now we have managed to retain an annual income of ~£1M to spend on grant funding, it is unclear whether that can be maintained in the near future. Fortunately, through prudent management over the past few years, we have an income reserve that can be used until, hopefully, the financial climate improves.

However, it will be important to continue to be prudent with our resources and it will become increasingly important to encourage donations to Medical Research Scotland. No easy task in this economic climate, where nearly everyone has been affected to some degree and with every charity competing for a slice of the cake. Hopefully the uniqueness of Medical Research Scotland, with its Scottish identity and its focus on young people can be capitalised upon. In July, we are holding a reception at the Palace of Holyroodhouse, at which our Patron HRH, The Princess Royal will be present. This should provide an opportunity to highlight the work of Medical Research Scotland to a wider audience.

Being Chairman of Medical Research Scotland has been a privilege which I have enjoyed enormously. The Trust functions well and the Members work as an excellent team. I am grateful to all those who have come and gone during my time. Their task is not an easy one but everyone has given of their time and expertise unstintingly. There are a few people whom I must single out for particular thanks. Dr Joan Macnab who is unique in her commitment to this charity and in the enormous amount of work she does for it - I could not have done the job without her guidance and support and I am greatly indebted to her for her friendship; Simon Mackintosh and Alexander Garden of Turcan Connell who act as Secretaries to the Trust and have guided me through the various nuances of charity work, not least the legal and fiscal aspects; Fred Dalgarno who has chaired the Audit & Investment Committee with sound judgement and, latterly, has been deputy Chairman; and Fiona Selkirk who has masterminded the web and the publications with humour in times of stress. The list of those requiring thanks would be too long for this report, suffice to say that I am most grateful to all of you.

I have no doubts about a good future for Medical Research Scotland and I shall continue to watch progress over the years. My successor will be David Harrison, Professor of Pathology at the University of Edinburgh, who has been a Member of Medical Research Scotland for the last couple of years. I wish him well.

Professor S. Moira Brown OBE, FRSE

the year reviewed

We maintain our commitment to supporting high quality research carried out by young people in the early stages of their careers in medical research in Scotland. We fund research aimed at improving understanding of basic disease mechanisms, or leading to better diagnosis, treatment and prevention of disease.

With respect to **funding for research**, a total of seven research project grants were awarded during the year, information about which can be found on page four. It was also agreed to provide some partnership funding for a trial period, to the new Scottish Senior Clinical Fellowship Scheme. This has been established by the Scottish University Medical Schools, in partnership with the Scottish Funding Council, Scotland's Board for Academic Medicine and the UK Academy of Medical Sciences. It will provide a research-focused entry point to a permanent clinical academic career in medicine or dentistry in Scotland and seeks to maintain Scotland's international reputation in the field. Finally, having reviewed the outcome of the three-year pilot scheme of the Tyson Fellowship, it was decided not to continue to offer this restricted award, but instead to encourage members of the Nursing, Midwifery & Allied Health Professions to apply for standard project grants.

There was a more relaxed air to the annual **Research Open Day** in early May this year when there was a display of 11 posters outlining the research of current and recent grantholders, rather than formal presentations. Also, to mark her final full year as Chairman, invitations were sent to all those who had received grant funding during Professor Brown's tenure, as well as to former Members and distinguished guests. Held as usual at the Royal Society of Edinburgh and over the customary buffet lunch, it proved to be a successful event with some productive, supportive networking among all attending. The posters very ably demonstrated the great diversity and comprehensive nature of our research funding and the occasion allowed Members to learn how the careers of earlier grantholders had progressed thanks to early support from Medical Research Scotland.

The new **reporting system** for our funded grants is working well and the Trust's operational procedures for the declaration and recording of Members' Conflicts of Interest in applications have been tightened through the implementation of a facility within the secure online system.

The **Fundraising Sub-committee** has met to develop plans for a Reception to be held at the Palace of Holyroodhouse in July in the presence of our Royal Patron, to which a wide range of guests from Scotland's academic, business and professional sectors have been invited.

In these troubled financial times, the Secretaries have been having regular meetings with the **Investment Managers**, who provide monthly reports to the Audit & Investment Committee, meet that Committee twice a year and report to the full Trust at an annual meeting.

We were pleased that the *Annual Review 2007-08* was Highly Commended in the Association of Medical Research Charities (AMRC) Science Communication awards.

In the year ahead and in addition to ensuring the close monitoring of the investment portfolio and its income arising, and reviewing its services in line with existing timetables, the Trust will:

Work to ensure that it receives high-quality applications for research funding, including from engineers and physical scientists working with clinicians or biomedical scientists, from whom it has been agreed that applications would be accepted;

Appoint a new Chairman with effect from November 2009 and continue to keep the broader membership under review, both in terms of advance planning for retirements and re-appointments and ensuring a wide breadth of expertise;

Consider opportunities for partnership funding, and in particular the possibility of continued collaboration on the Scottish Senior Clinical Fellowship Scheme.

Once the new Chairman has taken office, a new Five-Year Plan will be finalised.

improving the nation's health

Grants awarded by Medical Research Scotland support fundamental, laboratory-based or related research that focuses on understanding the mechanisms and processes involved in the development or progression of disease, the results of which lead to better diagnosis, treatment, or prevention.

Clarifying the genetic links to osteoporosis in men

Osteoporosis not only affects up to 30% of women, but also 12% of men at some point in their lives. Although genetic factors are known to play an important part in the disease, most of the genes responsible remain to be identified. Further, most of the research has focused on women, with little information on the genetics of osteoporosis in men. Having earlier identified a region on a particular chromosome that predisposes to osteoporosis in men, **Dr Omar Albagha** and Professor Stuart Ralston of Edinburgh University's Molecular Medicine Centre, were funded to define the specific gene variations involved in controlling bone mass in men and thus improve the diagnosis and treatment of this widespread debilitating disease.

Improving diagnosis and development of visually-impaired children

Vision is vital in child development and many children with early brain damage (such as those born very prematurely or with hydrocephalus or cerebral palsy) have complex visual problems. The visual brain has two main pathways - the ventral and dorsal streams - each responsible for processing different types of visual information. Increasingly, it is being recognised that dorsal stream dysfunction is a common disorder in children with early brain damage. Grant funding enabled Glasgow Caledonian University's vision scientist **Dr Julie Calvert** and ophthalmologist Professor Gordon Dutton of the Royal Hospital for Sick Children, Glasgow, to validate a protocol they had developed to identify affected children and then to develop a rapid and objective test for use in vision clinics. In this way, parents, carers and teachers can be advised on how best to aid the intellectual, educational and social development of affected children.

Understanding neurotransmission in inflammatory diseases

Communication between nerve cells in the central nervous system (CNS) is mainly mediated by neurotransmitters, which are controlled by many factors including G-protein coupled receptors (GPCRs). However, a new group of GPCRs, activated by enzymes, has been found recently. These 'proteinase-activated receptors' (PARs), can be either protective or degenerative, depending on whether they are released in normal or inflammatory conditions. PARs have been implicated in rheumatoid arthritis and they might also be involved in neurodegenerative diseases like Alzheimer's, MS and Parkinson's. Working in Strathclyde University's Institute of Pharmacy & Biomedical Sciences, **Dr Trevor Bushell** has investigated a single subtype (PAR2), in order to understand more about its functional role in the CNS in normal and disease conditions.

Exploring links between diet and age-related cognitive decline

Age-related decline in cognitive function is well recognised as a major risk factor in the morbidity associated with normal ageing. There is increasing evidence that diet and calorie intake are linked to the development of age-related diseases, such as cognitive decline and also in neurodegenerative disorders like Alzheimer's disease. Leptin is a key hormone which, as well as regulating food intake and body weight, is also involved in the processes underlying learning and memory (cognitive function). Grant funding to **Dr Jenni Harvey**, of the Centre for Neuroscience at Dundee University, enabled her to confirm that age-related changes in brain leptin function are linked to cognitive performance.

grants awarded

08/09

During the year, the Members awarded a total of seven Research Project Grants, totalling just under £800,000 in value, for work into kidney disease, melanoma, cystic fibrosis, bacterial infection, papillomavirus and cancer drug treatment.

£85,219 over 19 months to **Dr Andrew J. Roe** (Infection & Immunity) & Dr Richard Burchmore (Functional Genomics Facility), University of Glasgow, for the identification of proteins targeted by salicylic aldehyde inhibitors in *Escherichia coli* O157.

Infection with E. coli O157 is very high in Scotland and this project aims to reduce the disease burden, by identifying pointers to the development of compounds able to block the bacterium's ability to attach itself to the gut wall.

£56,016 over 12 months to **Dr David A. Ferenbach**, Drs Jeremy Hughes & David Kluth (Centre for Inflammation Research, University of Edinburgh), for an investigation of the role of resident renal macrophages and apoptotic cells in preventing acute kidney injury.

Tissue damage results from oxygen deprivation and, in kidney disease, is often fatal. Investigating the potential of cells from the body's immune defence and repair system, not normally found in the kidney, to protect kidney cells from damage is the aim of this project.

£133,793 over three years to **Dr Joanna L. Parish** (Bute Medical School, University of St Andrews), for a structural study of ChIR1, a DNA helicase required for sister chromatid cohesion and papillomavirus genome persistence.

Accurate copying and separation of DNA in cell division is essential for growth and maintenance, and its failure can result in cancer. During the process, duplicated chromosomes are temporarily 'glued together' by a protein complex. An enzyme (CHIR1), important in the gluing process and also involved in cervical cancer, will be studied using X-ray crystallography.

£149,761 over three years to **Dr Hironori Ishizaki** & Dr Elizabeth Patton (Edinburgh Cancer Centre, University of Edinburgh) for an investigation involving a small-molecule approach to melanocyte development, regeneration and disease.

The most aggressive form of malignant melanoma is fatal, being resistant to chemotherapy and its incidence is increasing in Scotland. This project aims to improve understanding of how the pigment cells (melanocytes) develop, migrate and survive and also the genetic and cellular events that result in invasive cancer.

£145,332 over three years to **Dr Nial Wheate**, Dr Oliver Sutcliffe & Professor David Flint (Strathclyde Institute of Pharmacy & Biomedical Sciences, University of Strathclyde) to investigate folic acid-directed delivery of platinum(II)-based anticancer drugs using PAMAM dendrimers.

Chemotherapy for many cancers uses mainly three platinum-based drugs, all having severe side-effects, because they attack normal and cancerous cells. This limits the amount of drug used and the cancers can become resistant, so patients relapse. This project aims to improve treatment by investigating whether a combination of drug attachment to polymers and folic acid enables more specific targeting of the cancer cells.

£112,252 over two years to **Dr Daniel Walker** (Division of Infection & Immunity, University of Glasgow) to study the antimicrobial activity of novel protein antibiotics against *Pseudomonas aeruginosa* in the biofilm state.

Persistent lung infection with the bacterium Pseudomonas aeruginosa is the major cause of death in cystic fibrosis. Naturally resistant to many antibiotics and acquiring resistance to others, P. aeruginosa can grow as a thin film (biofilm) in the lungs in cystic fibrosis and in this state, is virtually impossible to eradicate. Small protein antibiotics will be investigated for their ability to prevent biofilm formation and kill bacteria in existing biofilms.

£139,339 over two years to **Dr Pasquale Maffia** & Dr James Brewer (Strathclyde Institute of Pharmacy & Biomedical Sciences, University of Strathclyde) for a project involving the visualisation of antigen presentation in mouse models of atherosclerosis.

Cardiovascular diseases are the most common causes of death in Scotland and although immune responses are known to be important in atherosclerosis (hardening of the vessels), the detailed mechanisms remain unknown. State-of-the-art technology will track, in real time and in detail, the various parts of the immune response, with the aim of providing the information needed to improve current drug treatments.

Legacies & Donations Received

The following legacies and donations were received with gratitude by the Members. Unless otherwise indicated, all will be applied in support of general medical research.	From the Nairn Trust	1,000
	From Mr Dennis McWilliam (on behalf of his late father) for Parkinson's Disease	625
	Less adjustment for legacy residue accrued in previous year*	(1,108)
	TOTAL	517

*In the 2007-08 accounts, income of £7,000 was accrued, based on an estimate provided by the executor: the actual amount received was £5,892.

Royalties arising from the commercialisation of research previously funded by Medical Research Scotland/SHERT amounted to **£37,740** during the year.

Financial Summary

The Trust can only spend income, so relies on the income from its investments augmented by legacies, donations and royalties. Income generated on the investment portfolio and related cash deposits was £1,105,862 during the year, compared with £1,182,389 in 2007-08. As at 31st March 2009, the value of the Trust's investment portfolio (including capital cash) was £19,439,437, compared with £28,887,613 at 31st March 2008. The Trust's investments are divided into Restricted and Unrestricted Funds: the former supporting research into specific diseases; the latter being available to support any area of the Trust's work.

Income & Expenditure Summarised

	2009 £	2008 £
INCOME		
Legacies & donations	517	102,806
Royalties	37,740	58,951
Investment income	1,105,862	1,182,389
Total incoming resources	1,144,119	1,344,146
EXPENDITURE		
Costs of generating voluntary income	7,596	17,282
Investment management cost	66,765	74,528
Grants payable	639,054	357,494
Support costs of grant-making	190,100	156,224
Governance costs	45,831	44,219
Total resources expended	949,346	649,747
FUND BALANCES at 31st March	21,371,564	30,700,492

The financial information above is extracted from the full Report & Accounts for the year to 31st March 2009 which are due to be approved in late August and which it is anticipated will receive an unqualified audit report from Chiene + Tait, Chartered Accountants, Dublin Street, Edinburgh. The full accounts will be available after August 2009 on application to the Trust Secretaries and also on the website at: www.medicalresearchscotland.org.uk/reports.htm

As Scotland's largest independent charity funder of medical research, Medical Research Scotland is committed to:

- Supporting people in the early stages of their careers in medical research in Scotland.
- Supporting only the highest-quality clinical and laboratory-based medical research, which is aimed at improving understanding of the basic mechanisms of disease processes; or the diagnosis, treatment or prevention of disease; or the advancement of medical technology.

PATRON - HRH The Princess Royal

MEMBERS

The following served as Members of the Trust during the year:

*Professor S Moira Brown, OBE, PhD, FRCPath, FRSE (Chairman)
Dr Marie Boyd, BSc, PhD
Dr Denise Coia, MBChB, FRCPsych
Professor William Cushley, BSc, PhD
*Mr Frederick Dalgarno, LLB, DipIM, CA
Professor David J Harrison, BSc, MBChB, MD, FRCPath, FRCPE, FRCS(Ed)
Professor Margarete Heck, BSc, PhD (*until 8 May 2008*)
Dr Karen Horsburgh, BSc, PhD
Professor Allan M. Mowat, BSc, MBChB, PhD, FRCPath
*Mr John Naylor, OBE, MA, CCMl
*Ms Fiona Nicolson, MA, LLB, DipLP
Professor Michael Steel, BSc, MBChB, PhD, DSc, FRCPE, FRCSE, FRCPath
*Mr Alan A Stewart
Professor Stephen J Wigmore, BSc, MBBS, MD, FRCSEd, FRCS
* Denotes membership of the Audit & Investment Sub-Committee

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AUDITORS:

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FUNDING A HEALTHIER FUTURE

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Medical Research Scotland is the operational name of the Scottish Hospital Endowments Research Trust (SHERT), which is recognised as a charity in Scotland with Charity No. SC014959.

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