

CURRICULUM VITAE

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CONTENTS

- Personal
- Qualifications
- Appointments
- Key prizes, awards and appointments
- Research interests
- Current research grants held
- Publications
- Research lectures, seminars and symposia
- Current research staff
- Industrial interactions and patents
- Leadership of scientific societies
- University duties
- Other activities

APPENDIX

- I Research achievements

PERSONAL

Name: Nancy Jane Rothwell

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Date of birth: 2nd October 1955

Nationality: British

QUALIFICATIONS

1976 BSc Physiology (1st Class Hons) London
1978 PhD London
1989 DSc London

APPOINTMENTS**Present Appointment:**

1998 - MRC Research Professor, University of Manchester
2007 - Deputy President and Deputy Vice-Chancellor

Previous Appointments:

1976-1978 Postgraduate student (SERC CASE award), Department of Physiology, Queen Elizabeth College (and Unilever Research Laboratories, Colworth House, Beds).

1978-1979 Postdoctoral Research Fellow, Department of Physiology, Queen Elizabeth College.

1979-1982 Postdoctoral Research Fellow, Department of Physiology, St George's Hospital Medical School.

1982-1984 Royal Society Research Fellow (Foulerton Gift & Binmore Kenner), Department of Physiology, St George's Hospital Medical School.

1984-1987 Royal Society University Research Fellow and Honorary Lecturer, St George's Hospital Medical School.

1987-1991 Royal Society University Research Fellow, Department of Physiological Sciences, University of Manchester.

1989-1991 Honorary Reader, University of Manchester.

1991-1994 Reader, University of Manchester

1994- Professor of Physiology, University of Manchester.

1996-1998 Research and Graduate Dean, School of Biological Sciences.

1998-2000 Chairman, Division of Neuroscience, University of Manchester

2001-2004 Deputy Research Dean, School of Biological Sciences

2004-2007 Vice President for Research, University of Manchester

A summary of my research achievements is included in Appendix I

KEY PRIZES, AWARDS AND APPOINTMENTS (SELECTED)

1995 Pfizer Research Prize

1995 Charles Darwin Lecturer, BAAS

1996 Gaddum Prize, British Pharmacological Society

1997 Physiological Society Annual Prize Lecture (delivered in 1998)

1998 Royal Institution Christmas Lectures, also delivered in Japan and Hong Kong

1998-2004 Founder and Chairman, UK Life Sciences Animal Science Group

1998 Fellow, Royal Society of Arts, Manufactures and Commerce

1999 Fellow, Academy of Medical Sciences

2000-2004 President, British Neuroscience Association

2000-2002 Chair, MRC Physiological Medicine and Infections Board

2002-2004 Chair, MRC Neurosciences and Mental Health Board

2000-2004 Member MRC Council and Strategy Board

2001 RAE Panels UoA 5 - 8

2001 President, Medical Section, British Association for the Advancement of Science

2002-2005 Trustee and Council Member, NESTA (National Endowment for Science Technology & Arts)

2002-2007 Trustee and Council Member, Cancer Research UK

2002-2003 Chair, UK Life Sciences Committee
 2002- Fellow, Institute of Biology, Honorary Fellow from 2007
 2002-2005 Member, Royal Society, Animal Research Committee
 2002-2005 Member, Council, Academy of Medical Sciences
 2003-2007 Founder Member and Honorary Treasurer, Biosciences Federation
 2004-2006 Chair, GSK Neurology Advisory Board
 2003 Pfizer Award for Innovative Science
 2003-2006 Member MRC Training and Career Development Board
 2004 Fellow, Royal Society
 2004-2007 Chair, Research Defence Society
 2005-2008 Chair, National Centre for 3Rs on Animal Research Grants Panel
 2005-2008 Member RAE, Panel 15
 2005-2008 Member, BBSRC Council
 2005-2008 Chair, Wellcome Trust Public Engagement Strategy Committee
 2005 Dame Commander of the British Empire
 2006- Non-executive Director of AstraZeneca
 2006 Honorary Fellow, Royal College of Physicians
 2006 Fellow, Academia Europaea
 2007- Chair, AstraZeneca Board Science Committee, Member Remuneration Committee
 2007-2008 Member, Advisory Committee on Science and Research in the Department of Health, Chaired by Sir David King
 2008- Honorary Fellow, Institute of Biology
 2008- Chair, Interim Council for the Biosciences Federation/Institute of Biology, Chair elect Society of Biology
 2008- Chair, Royal Society Education Committee
 2008- President, Biosciences Federation
 2008- Council Member and Vice President, Royal Society

Honorary Doctorates: Universities of Oxford, Leeds, Glasgow, Salford, Leicester
 King's College London, St Andrew's, St George's Medical School,
 London,

RESEARCH INTERESTS

Neuroimmune interactions: actions of cytokines in the brain, mechanisms of neurodegeneration, brain control of responses to disease and injury.

- 1) Sites and mechanisms of action of cytokines in the CNS.
- 2) Mediators and mechanisms of neuronal injury and repair.
- 3) Mechanisms and mediators underlying neuroimmune responses.
- 4) Role of integrins and extracellular matrix in neuronal injury and cytokine actions.
- 5) Role of inflammation and cytokines in ischaemic, haemorrhage and traumatic brain injury in patients, and therapeutic interventions.

CURRENT RESEARCH GRANTS HELD (PI on all of these)

Personal Research Awards

	£
MRC Professorship (renewed 2009-2012)	450,000
MRC Experimental Medicine (2006-2009) Pharmacokinetics and proof of principle of IL-1RA in patients	500,000
MRC (NMHB) 2009- 2012 Mechanisms of interleukin-1 action in neuronal injury	755,000
MRC (Models of Disease) (2008-2011) Subarachnoid haemorrhage as a valid model for stroke	800,000
BBSRC (2008-2011) Combinatorial systems biology of ROS regulated interleukin-1 gene expression	612,000
EU FP7 (2008-2013) ARISE (Affording Recovery in Stroke)	768,000
MRC (PSMB) Impact of peripheral inflammation on cerebrovascular disease	800,000
TOTAL	£ 4,685,000

Institutional Awards

PI on Integrative Mammalian Biology Infrastructure Award £2.7M, 2007-2010

PI on HEFCE Beacons for Public Engagement £1.2M, 2008-2012

Sponsor of three other fellowships held by researchers in my lab (Wellcome Trust, Swedish Academy, Research into Ageing – one clinical).

PUBLICATIONS

Over 250 peer-reviewed research papers and 100 reviews. (see Appendix II for list of research papers and reviews). Abstracts not shown.

RESEARCH LECTURES, SEMINARS AND SYMPOSIA

Some examples of recent, invited lectures

Princeton Conference on Stroke, San Francisco, USA (2000)
Federation of European Neuroscience Societies Plenary Lecture, Brighton (2000)
European Glia Meeting, Plenary lecture, Barcelona (2000)
European Stroke Meeting, Plenary lecture, Marburg (2000)
North West Innovation Lecture, Manchester (2000)
British Association of Stroke Physicians, Plenary Lecture, London (2001)
German Neuroimmunology Society, Plenary Lecture, Reisburg (2002)
British Inflammation Research Association, Bath (2002)
Euroconference on Neuroimmunology, Barcelona (2002)
European Stroke Conference, Magdeburg (2003)
European Conference on Glia, Amsterdam (2005)
Cytokines in Medicine, Manchester (2005)
Fison Lecture, King's College University, London (2005)
Annual Life Sciences Conference, Glasgow (2006)
ESF Conference on Brain Inflammation, Germany (2006)
Immunogenetics of disease, Budapest (2006)
Annual Lecture, Royal Swedish Academy, Stockholm (2007)
Plenary lecture, European Stroke Meeting, Glasgow (2007)
Annual Harwell Lecture (2007)
Huxley Lecture, Imperial College (celebrating bicentenary of the Medical School), London (2007)
Dalton Lecture, Manchester (2007)
Leverhulme Lecture, Liverpool (2008)
WISSETTI Lecture, Cambridge (2009)
Dow Memorial Lecture, Dundee (2009)
Institute of Biology Charter Lecture (2009)

Invited Review Lectures & Seminars

Over 350 presented in the UK, USA, Canada, India, China, France, Germany, Holland, Hong Kong, Italy, Japan, Sweden, Denmark, Australia, Switzerland, Spain and Austria.

Summary of some recent presentations

RI Christmas lectures in Hong Kong, public lectures UK (~ 10 pa), India, China, South Africa and Singapore;
Seminars: Immunex, Seattle, Merck, San Diego, University of Oxford, Boehringer Ingelheim, New York, Certificate Holders Forum, York, Parliamentary and Scientific Committee, London, GSK, Harlow, German Soc Neuroimmunology, Institute of Neurology Annual Graduate Symposium Lecture, Kings College London, Annual Science Lectures Universities of Glasgow, Aberdeen, York, Cambridge, Dundee, Imperial, Oxford.

Recent Symposium and Conference Organisation

William Harvey Conference, Novel Mechanisms of Neurodegeneration (London, 1998)
Pharmacology of Cerebral ischaemia (Marburg, July, 1998, 2000, 2002, 2004)
Cytokines as therapeutic agents EPHAR (Hungary, 1999)
EU Symposium IL-1 receptors (Biarritz, April 2000)
Royal College of Physicians Therapeutics of stroke management (London, November, 2001)
Academy of Medical Sciences Neuroprotection (London, December 2001)
IL-1 in the brain. International Conference (Manchester, 2004, 2007)
Pharmacology of Cerebral Ischaemia, Advisory Board (2000, 2002, 2004, 2007)

CURRENT RESEARCH STAFF

Post-doctoral:

B. McColl	(BBSRC)
H. Boutin	(MRC)
D. Bentley	(University)
P. Thornton	(MRC)
A. Denes	(EU)
O. Nielsson	(Swedish Academy)

S. Friedrickson (MRC)

Post-graduate: J. Galea (Clinical Research Fellowship)
K. Chapman (BBSRC, UCB Celltech)
A. Greenhalgh (MRC)
L. Nguyen (Self funded)
N. Singh (NHS/University)
C. Drake (BBSRC)

Over 50 PhD students supervised to date, all completed within 4 years

INDUSTRIAL INTERACTIONS & PATENTS

Previous Consultancies: Astra-Zeneca Pharmaceuticals (UK), Merck (US and UK) Amgen (USA), Schering (Germany), Pharmagene (UK), Pfizer (UK and US), many biotech companies

Scientific Advisory Board: GSK Neurology Board (Chair) 2003-2006

Non-Executive Director: AstraZeneca 2006- , chair of board science committee, member remuneration committee.

Patents: Patent granted in USA on novel treatments for Neurodegeneration (University of Manchester, Inventor, N.J. Rothwell, 2000), pending in Europe, Australia and Japan.

Product licensing: Preclinical and pharmacodynamics Expert for submission of Betaferon (Interferon β -1b, Schering AG) to European Authorities for the treatment of multiple sclerosis (approved 1995).

LEADERSHIP OF SCIENTIFIC SOCIETIES

British Neuroscience Association (President 2000-2004)

British Pharmacological Society (ex-Chairman of Animal Welfare Committee, ex-Committee member, current member Strategy Group).

Biochemical Society - (ex Committee Member Molecular Pharmacology Group)

International Cytokine Group (Committee Member 1998-2000)

Biosciences Federation Founder member and Treasurer, 2004-7, President 2008-

President Biosciences Federation, 2008 and President of soon to be formed Society of Biology

UNIVERSITY DUTIES (Selected)

Academic Director Biological Services Facility (Animal Unit) (1995 -)

Member of University Research Committee (1996 - 2000), Biological Sciences Development Subcommittee (1995-2003), University Ethical Review Committee (1999 -2005)

Research and Graduate Dean, Biological Sciences (1996-1998)

Founder and Organiser, Post-doctoral Career Development Programme (1996 - 2000)

Overall responsibility for career development and progression of all research fellows in Biological Sciences (1996-2000)

Chairman, Division of Neuroscience (1999–2000)

Responsibility for UoA 5 RAE submission (~ 95 staff) 2001 (awarded 5*)

Chair, Review of the structure of the School of Biological Sciences (2001)

Deputy Research Dean, School of Biological Sciences (2002-2004)

Director, Institute of Neuroscience (2004-2006)

Vice President for Research (2004 -)

Deputy President and Deputy Vice Chancellor, responsible for whole University RAE submission RAE 2008.

OTHER ACTIVITIES (some examples)

Royal Society Committee on Research Careers (1995)

Presented evidence to the House of Lords Select Committee on Careers (1995)

President, British Neuroscience Association (2000-)

Founder and Chair, UKLSC Animal Science Group (1998-)
Member, Pharmaceutical Industry Competitive Task Force working party on animals in research chaired by Lord Sainsbury (2001-)
Academy of Medical Sciences Group on research careers (2004-2006)
Member, Special group on animal research presenting to the Home Secretary (2001-2005)
Advisory Board, National University of Singapore (2005-2008)

Grants Committees

Royal Society Dorothy Hodgkin Fellowship Committee (1995-2000)
MRC JREI Committee (1999)
MRC Neuroscience Grants Panel (1995-1997)
MRC Strategy Group - Psychoneuroimmunology (1997)
MRC Advisory Board (1997-2000)
MRC ROPA Committee (1996, 1997)
MRC Strategy Group - Neuroprotection (1996)
MRC Working Party on Careers (1996)
Wellcome Trust - International Grants Committee (1995-1999)
Royal Society/Fulbright Fellowship Committee (2001)
Research into Ageing Council (2000-2001)
Wellcome Trust SHOWCASE (2001-2002)
MRC Physiological Medicine and Infections Board, Chair (2000-2002)
MRC Council, Training and Careers Board, Strategy Group, Inter Board Initiative Group, Cross Board Trials Group (2000-2004).
MRC Neuroscience and Mental Health Board Chair (2002-2004)
Royal Society Dorothy Hodgkin Fellowship Committee (2001-2004)
MRC Training and Career Development Panel (2003-2006)
NESTA Fellowship Committee (2002-2004)
NESTA Trustee (2002-2005)
Royal Society Rosalin Franklin Award Committee (2004-2007)
Wellcome Trust Public Engagement Strategy Group, Chair (2005-2008)
MRC Funding for "3Rs" in animal use, Chair (2004-)
BBSRC Council (2005-2008)

Editorial Board Member: American Journal of Physiology (1989-2000), Neuropharmacology (1992-), Endocrine Regulation (1991-), Trends in Neuroscience (1994-), Molecular Psychiatry (1995-2000), Journal of Neuroimmunology (1997-2001), Journal of Cerebral Blood Flow and Metabolism (2002-), Current Opinion in Pharmacology (2000-), Neuropharmacology (2003-)

Examples of delivery of science to the public

"*The Fat in the Fire*" (Horizon, BBC2, 1979).
"*The Fat of the Land*" (Medicine Now, Radio 4, 1984).
"*Animal Physiology*" (Open University, 1984).
Medicine Now (BBC Radio 4, 1997) two programmes
"*The Big Bang*" (BBC Radio 4, 1997)
British Association, Charles Darwin Lecture (1995)
British Association lectures (1997, 1998, 2001)
Science Week lectures (1997, 1998, 1999, 2000)
Royal Institution Christmas Lectures BBC TV (1998)
"Are you Superhuman" BBC TV (2000)
"Get fit stay healthy" BA symposium, organiser (2002)
"Understanding the brain", BA Symposium organizer (2003)
Many articles written for non-scientists e.g. Biological Sciences Review, New Scientist, The Times, The Telegraph, The Guardian and several international news reports.
The Royal Institution Christmas Lectures (BBC TV, Dec/Jan 1998, NKTV Japan, 1999), also delivered in Japan, Hong Kong and several UK regions
President, Medical Section, BA (2001-2002), member of Programme Committee (2002-)
THES monthly columnist (2004-2006)
PI HEFCE Beacons of Public Engagement Award (£1.2M)

Numerous appearances, radio programmes (eg Science Now, Medicine Now, Material World), magazine/newspaper articles and presentations to the public, particularly children, e.g. active member of WISE.

I annually mentor school children on lab work experience, have close liaison with local schools (particularly those in underprivileged areas, and I have introduced workshops on “*Bringing science to the public*” to graduate students and young scientists.

I give approximately 10-12 public and schools lectures each year.

APPENDIX I

RESEARCH ACHIEVEMENTS

Research during the early part of my career investigated the mechanisms involved in energy balance regulation, and then focused on how the brain integrates and controls stimuli which modify thermogenesis. Recently we established that, in addition to systemic stimuli, damage to the brain elicits marked increases in local cytokine production. The accepted dogma had been that these molecules exert beneficial effects on neurodegeneration and repair. However, we demonstrated that the cytokine interleukin-1 (IL-1) mediates or exacerbates damage and are now investigating its mechanism of action. My major research achievements are summarised below.

- During my PhD and early post-doctoral studies I showed that increased energy expenditure (thermogenesis) is a quantitatively important component of energy balance regulation in normal mammals, and is due to sympathetic nervous system activation of brown adipose tissue (BAT). These findings formed the basis of a research article in *Nature*.
- I subsequently identified neural, hormonal and environmental factors which control BAT activity, demonstrated that disruption of system is largely responsible for impaired energy balance in genetically obese and ageing animals, showed that specific regions of the brain and central neurotransmitter systems and hormones influence BAT activity and hence energy balance, and demonstrated important relationships between the central control of appetite and thermogenesis.
- I demonstrated that common mechanisms operate in both animals and humans to activate thermogenesis in response to environmental stimuli and pathogenic insults, which in the latter case result in fever and cachexia (wasting).
- The major signals for fever and metabolic responses to disease and injury are cytokines. At a time when research on interactions between the nervous and immune system was in its infancy, I demonstrated that specific cytokines act in the brain via mechanisms, (which we had already identified in energy balance regulation), to activate fever and thermogenesis.
- I then showed that corticotrophin releasing factor (CRF), a protein classically associated with neuroendocrine responses to stress, mediates central actions of specific cytokines. CRF has now been identified as an important mediator of diverse actions of cytokines in the brain, and as a key factor in neuroimmune interactions.
- My recent and current research has extended these observations by elucidating the mechanisms linking cytokines, prostaglandins and CRF in the brain, identification of a novel and potent inhibitor of cytokine action in the brain (lipocortin-1) and providing data to support the existence of novel cytokine receptors in the brain. These findings are of relevance to acute and chronic responses to disease and injury that are mediated by the brain.
- My research group has developed and investigated several models of systemic and brain injury and infection in experimental animals, and our results on experimental and clinically induced inflammation in humans supports our findings in animals.
- We have provided direct evidence that IL-1 mediates experimentally induced ischaemic, excitotoxic and traumatic brain injury, a finding which changed current thinking on cytokine effects in the CNS. We have further shown that CRF is involved in neurodegeneration, and that lipocortin is an endogenous inhibitor of neurodegeneration, which probably exerts the most potent effects on neuronal damage so far identified.
- Our research has also provided evidence to support the involvement of IL-1 in chronic neurodegenerative diseases such as Alzheimer, since our data indicate that IL-1 could be the proposed link between brain damage, β -amyloid precursor protein expression and hence neurological

symptoms of Alzheimer's disease.

- Recently we have identified novel neuronal pathways involved in IL-1 actions on neurodegeneration. We showed that IL-1 acts at specific sites in the striatum to activate striato-hypothalamic-cortical pathways.
- Our research has demonstrated that effects of leptin (a key mediator of appetite and body weight regulation) are dependent on release and actions of IL-1 and CRF in the brain, indicating that leptin may be a key neuroimmune mediator.
- Studies on neurodegeneration have resulted in patents (filed by the University of Manchester) for novel treatments of acute and chronic neurodegenerative diseases, have stimulated interest from several major pharmaceutical companies which are now developing strategies for modifying IL-1 action in the brain.
- We have completed the first successful clinical study of a cytokine inhibitor (IL-1RA) in stroke patients and are now studying whether inflammation and cytokines contribute to the development of stroke and Alzheimer's disease.