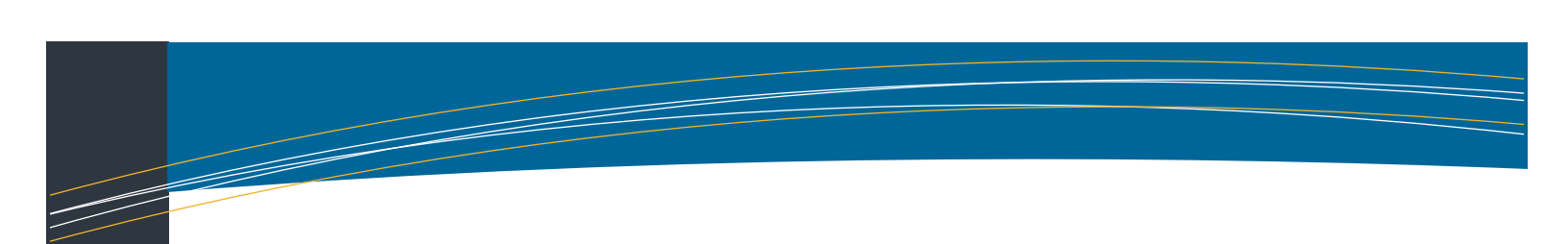


Centre for Cardiovascular Science

STAFF PROFILES



The Centre for Cardiovascular Science is a world-leading centre of excellence that integrates discovery, translational and clinical cardiovascular research to transform the diagnosis, treatment and management of people with heart and circulatory diseases.

We are working with local, national and international partners and funders to develop solutions to our research challenges with regional and global impact.

Our major research challenges are:

1. To understand the body's responses to vascular, renal and myocardial injury and to harness mechanisms that can improve tissue repair, remodelling and regeneration.
2. To identify shared mechanisms and novel therapeutic targets for hypertension, vascular dysfunction, small vessel disease, stroke & dementia.
3. To identify therapeutically targetable metabolic drivers of cardiovascular disease across the life course in order to prevent disease progression.
4. To develop novel imaging approaches that will accelerate the mechanistic evaluation of cardiovascular injury and repair, and to use such innovation to guide clinical diagnosis and treatment decisions in patients.
5. To improve diagnosis, risk stratification, and targeting of treatments in patients with heart and circulatory diseases globally, notably by harnessing Scotland's comprehensive whole population-linked health care data.



Cardiovascular Injury, Repair & Regeneration

Prof Andy Baker

BHF Professor of Translational Cardiovascular Sciences,
Gustav Born Chair of Vascular Biology,
Head of Centre for Cardiovascular Science

Biography



Andrew graduated from the University of London in 1990 in pharmacology and toxicology and from the University of Wales College Of Medicine in 1994. His post-doctoral work in Cardiff focused on the development of adenoviral vectors for gene delivery studies in the cardiovascular system. On a University of Bristol lectureship, he continued studies on adenovirus-mediated gene transfer to assess vascular function and gene therapy. In 1999, he joined the University of Glasgow as a Senior Lecturer in Molecular Medicine, then as Reader and in 2005 as Professor of Molecular Medicine. Andrew was awarded the Blandsford Prize in pharmacology (1990), the "Update in Thrombolysis Research" (Berlin, 1998), and the British Cardiac Society Young Investigator Research Prize (1999). The Royal Society of Edinburgh awarded him the MakDougall-Brisbane prize in 2008 and a fellowship in 2010. He was awarded an Outstanding Achievement Award from the European Society of Cardiology (2010) and a Royal Society Wolfson Research Merit Award (2011). He was Acting Director of the Institute for Cardiovascular and Medical Sciences at the University of Glasgow from August 2010 to November 2011. He was awarded a British Heart Foundation Chair of Translational Cardiovascular Medicine in 2011, which he relocated to the Queen's Medical Research Institute, University of Edinburgh from 1st October 2015. Also in 2015, he was awarded a Fellowship of the Academy of Medical Sciences. In 2017 Andrew also took up the position of Head of the Centre for Cardiovascular Science.

Research Interests

- ◆ Vascular injury, repair and regeneration
- ◆ Gene and cell therapy approaches in the vascular system
- ◆ Function of non-coding RNA in vascular pathology
- ◆ Mechanisms associated with vascular remodelling

Techniques

- ◆ *In vivo* models of vascular remodelling
- ◆ *In vitro* models of vascular disease

Key publications

- ◆ Caruso P, Dempsey Y, Stevens H, McDonald RA, Long L, Lu R, White K, Mair K, McClure JD, Southwood M, Upton P, Xin M, van Rooij E, Olson E, Morrell NW, Maclean MR and **Baker AH**. A role for miR-145 in pulmonary arterial hypertension: Evidence from mouse models and patients samples. *Circulation Research*, 2012, 111: 290-300. PMID: 22715469.
- ◆ McDonald RA, White KM, Wu J, Cooley BC, Robertson KE, Halliday CA, McClure JD, Francis S, Lu R, Kennedy S, George SJ, Wan S, van Rooij E, H **Baker AH**. MiRNA-21 is dysregulated in response to vein grafting in multiple models and genetic ablation in mice attenuates neointima formation. *European Heart Journal*, 2013, 34(22):1636-43.
- ◆ Denby L, Ramdas V, Lu R, Conway B, Grant JS, Dickinson B, Aurora AB, McClure J, Kippen D, Delles C, van Rooij E and **Baker AH**. MiRNA-214 antagonism leads to protection from renal fibrosis. *J Am Soc Nephrol*, 2014, Jan 25(1):65-80.
- ◆ McDonald RA, Halliday CA, Miller AM, Diver L, Dakin R, Robertson KE, McBride MW, Kennedy S, McClure JD, Montgomery J, Douglas G, Channon KM, Oldroyd KG & **Baker AH**. Decrease in miRNA-21 reduces in-stent restenosis and inflammation. *Journal of the American College of Cardiology*, 2015, 65 (21) 2314-2327.
- ◆ Deng L, Blanco FJ, Stevens H, Lu R, Caudrillier A, McBride M, McClure JD, Grant J, Thomas M, Frid M, Stenmark K, White K, Seto AG, Morrell NW, Bradshaw AD, MacLean MR, **Baker AH**. miR-143 activation regulates smooth muscle and endothelial cell crosstalk in pulmonary arterial hypertension. *Circulation Research* 2015; 117:870-883 published online before print August 26 2015, doi:10.1161/CIRCRESAHA.115.306806.
- ◆ Ballantyne, MD, Dakin R, Pinel K, Vesey AT, Diver L, Mackenzie R, Garcia R, Welsh P, Sattar N, Hamilton G, Joshi N, Dweck MR, Miano JM, Newby DE, McDonald RA, **Baker AH**. Smooth muscle enriched long non-coding RNA (SMILER) regulates cell proliferation. *Circulation* 2016; 133: 2050-2065. doi: 10.1161/CIRCULATIONAHA.115.021019.

Dr Andrea Caporali

Chancellor's Fellow, Centre for Cardiovascular Science



Biography

- ◆ 10 years' experience in the field of vascular biology with interest in cell signalling and post-ischaemic angiogenesis.
- ◆ Successful Personal Fellowship and project grants funding track (British Heart Foundation)
- ◆ Track record of high impact publications (Circulation, Circulation Research, Nature Communications, Molecular Therapy)
- ◆ Associate Editor (PlosOne, Frontier Cardiovascular Medicine) and member of working group Atherosclerosis and Vascular Biology at the European Society of Cardiology

Research Interests

- ◆ Identification of novel therapeutic targets for vascular regeneration (sequencing and high-content screening), mechanistic modelling in *in vivo* animal models with translational follow up.
- ◆ Vascular signalling (intra- and inter- cellular communication)
- ◆ RNA biology

Techniques

- ◆ Molecular biology and biochemical techniques (e.g. cloning, CRISPR/Cas9, immunoprecipitation)
- ◆ Primary cell isolation, cell culture (single and co-culture protocols) and gene manipulation
- ◆ *in vivo* model of post-ischaemic angiogenesis and wound healing and oligonucleotide delivery (siRNA and ncRNA)
- ◆ Real time analysis of cell behaviour (migration, barrier function and proliferation) using electric cell-substrate impedance sensing (ECIS)
- ◆ High-content screening approach (assay set up and validation)

Key publications

- ◆ Miscianinov V, Rose L, Martello A, Cathcart B, Meloni M, Zen AHA, **Caporali A**. "MicroRNA-148b regulates endothelial-to-mesenchymal transition and angiogenesis through canonical TGF-beta signalling during skin wound healing". *Molecular Therapy*. 2018 in press
- ◆ Masotti A, Miller MR, Celluzzi A, Rose L, Micciulla F, Hadoke PW, Bellucci S, **Caporali A**. "Regulation of angiogenesis through the efficient delivery of microRNAs into endothelial cells using polyamine-coated carbon nanotubes". *Nanomedicine*. 2016, 12(6):1511-22.
- ◆ **Caporali A***, Meloni M, Nailor A, Mitić T, Shantikumar S, Riu F, Sala-Newby GB, Rose L, Besnie M, Katare R, Voellenkle C, Verkade P, Martelli F, Madeddu P, Emanuelli C. "p75(NTR)-dependent activation of NF-κB regulates microRNA-503 transcription and pericyte-endothelial crosstalk in diabetes after limb ischaemia". *Nat Commun*. 2015, 6:8024

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Dr Mihaela Crisan

Chancellor's Fellow, Centre for Cardiovascular Science



Biography

- ◆ 15 years of experience in the fields of mesenchymal stem cells/pericytes and hematopoietic stem cell development
- ◆ Successful track record with European and country-based Funding (EMBO, Erasmus MC and EHA fellowships, NWO Veni grant and AMS award)
- ◆ Track record of high impact publications (Cell Stem Cell, Nature Biotechnology, Nature Communication, Stem Cells)
- ◆ Reviewer for peer-reviewed journals (Stem Cells, Stem Cell reports, cell Metabolism, etc) and funding bodies (Association Francaise contre les Myopathies/France, Flemish Research Organisation/Belgium, Agence Nationale pour la Recherche/France, equivalent of NIH, etc)

Research Interests

- ◆ Role of the perivascular niche to generate and expand hematopoietic stem cells *in vivo*
- ◆ Investigate the role of blood vessel integrity in heart and kidney homeostasis and disease
- ◆ Apply knowledge from animal models to mimic *in vitro* the hematopoietic and cardiac vascular niche that involve induced human/mouse pluripotent stem cell technology.

Techniques

- ◆ *In vitro* and *in vivo* hematopoietic assays
- ◆ Confocal microscopy and three-dimensional reconstruction of blood vessels
- ◆ Flow cytometry analysis and purification
- ◆ Cell (co)culture of (peri)vascular cells and hematopoietic cells to expand and differentiate.
- ◆ Ultrasound imaging and analysis

Key publications

- ◆ **Crisan, M.**, Solaimani Kartalaei, P., Vink, C., et al. BMP signalling differentially regulates distinct hematopoietic stem cell types. *Nat Commun.* 2015 Aug 18; 6: 8040.
- ◆ **Crisan, M.**, Solaimani Kartalaei, P., Neagu, A., et al. BMP and Hedgehog regulate distincts AGM Hematopoietic Stem Cells *Ex Vivo*. *Stem Cell Reports.* 2016 Mar 8; 6(3):383-95.
- ◆ **Crisan, M.**, Casteilla, L., Lehr, L., et al. A reservoir of brown adipocyte progenitors in human skeletal muscle. *Stem Cells.* 2008, 26(9):2425-33.
- ◆ **Crisan, M.**, Yap, S., Casteilla, L., et al. A perivascular origin for mesenchymal stem cells in human organs. *Cell Stem Cell.* 2008, 3(3):301-13.

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Dr Marc Dweck

British Heart Foundation Reader in Cardiology & Consultant Cardiologist



Biography

- ◆ Expert in multi-modality cardiovascular imaging and selecting the optimum research technique to answer the research question at hand
- ◆ >£20 million funding using multimodality imaging to improve our understanding of cardiovascular pathophysiology and testing the efficacy of novel therapeutic strategies
- ◆ Recipient of numerous national and international research prizes and awards (e.g. Sir Jules Thorn Award for Biomedical Research 2015; British Heart Foundation Outstanding Investigator Award 2015; Young Investigator Award, American College Cardiology Scientific Sessions 2015 & 2012; William W. Parmley Young Author Award Journal American College of Cardiology 2012).
- ◆ Chief investigator two ongoing randomized controlled trials of novel therapeutic strategies targeting valvular calcification and myocardial fibrosis in aortic stenosis (SALTIRE 2 NCT02132026 & EVOLVED NCT03094143)

Research Interests

- ◆ Coronary atherosclerosis: factors associated with disease activity, disease progression and plaque rupture
- ◆ Aortic stenosis
- ◆ Myocardial fibrosis
- ◆ Bioprosthetic valve degeneration
- ◆ Vascular inflammation and calcification in aortic and carotid atheroma, abdominal aortic aneurysms
- ◆ Cardiomyopathy (amyloid, sarcoid, dilated cardiomyopathy, hypertrophic cardiomyopathy)

Techniques

- ◆ Innovative clinical trial design using multi-modality imaging
- ◆ Computed tomography (CT calcium scoring, contrast CT techniques)
- ◆ Magnetic resonance imaging (left ventricular structure and function, myocardial fibrosis using both T1 mapping and late gadolinium enhancement)
- ◆ Positron emission tomography (measuring the activity of specific pathological processes including inflammation, calcification, angiogenesis, thrombus formation)

Key publications

- ◆ Joshi NV, Vesey AT, Williams MC, Shah ASV, Calvert PA, Craighead FHM, Yeo SE, Wallace W, Fox KAA, Rudd JHF, **Dweck MR**,* Newby DE.* 18F-Fluoride positron emission tomography for identification of ruptured and high-risk coronary atherosclerotic plaques: a prospective clinical trial. *The Lancet*. 2014; 383(9918):705-13. * senior author
- ◆ Forsythe RO, **Dweck MR**, McBride OMB, Vesey AT, Semple SI, Shah ASV, Adamson PD, Wallace WA, Chalmers RTA, Weir G, Mitchard N, Tavares A, Robson JM, Newby DE. 18F-Sodium Fluoride Uptake in Abdominal Aortic Aneurysms: The SoFIA3 Study. *J Am Coll Cardiol*. 2018 Feb 6;71(5):513-523.
- ◆ The Scot Heart Investigators. Computed Tomography Coronary Angiography in Patients with Suspected Angina due to Coronary Heart Disease. The Scottish COmputed Tomography of the HEART (SCOT-HEART) Trial. *The Lancet*. 2015. Jun 13;385(9985):2383-91
- ◆ **Dweck MR**, Jones C, Joshi N, Fletcher AM, Richardson H, White A, Marsden M, Pessotto R, Clark JC, Wallace WA, Salter DM, McKillop G, van Beek EJR, Boon NA, Rudd JHF, Newby DE. Assessment of valvular calcification and inflammation by positron emission tomography in patients with aortic stenosis. *Circulation*. 2012;125(1):76-86.
- ◆ **Dweck MR**, Joshi S, Murigu T, Gulati A, Alpendurado F, Jabbour A, Mohaiaddin, Pepper J, Pennell D, Newby DE, Prasad S. Mid-wall fibrosis is an independent predictor of mortality in patients with aortic stenosis. *Journal American College of Cardiology*. 2011;58;1271-1279.

Dr Gillian A Gray

Reader in Cardiovascular Pharmacology



Biography

- ◆ 30 years' experience in cardiovascular pharmacology research and drug discovery in industry and academia (UK & Europe)
- ◆ 77 Original MS; 20 Reviews & Editorials; H Index: 40; Career Citations: >7400, Research Gate Score 41.80 (top 2.5%)
- ◆ > £5 million research funding, including contract research and consultancy
- ◆ Fellow of British Pharmacological Society

Research Interests

- ◆ Identification of novel drug targets to prevent myocardial infarct injury, enhance repair (inflammation, angiogenesis and scar formation) and prevent detrimental remodelling in response to MI and pressure overload
- ◆ Development of novel myocardial imaging

Techniques

- ◆ *In vivo* models of myocardial infarction, reperfusion injury, cardiac hypertrophy, fibrosis, heart failure and neonatal cardiac regeneration
- ◆ Structural and functional myocardial imaging (high resolution ultrasound, MRI, optical projection tomography) and haemodynamics
- ◆ Flow cytometry, immunohistochemistry, immunoassay
- ◆ *In vitro* heart perfusion and vessel myography

Key publications

- ◆ White CI et al., (2016) Cardiomyocyte and vascular smooth muscle independent 11 β -hydroxysteroid dehydrogenase type 1 amplifies infarct expansion, hypertrophy and the development of heart failure following myocardial infarction. *Endocrinology* 157(1):346-57.
- ◆ Mylonas KJ et al., (2015) The murine heart has a sparse, phagocytically active resident macrophage population that expands through monocyte recruitment and adopts an 'M2' phenotype in response to Th2 immunological challenge. *Immunobiology* 220:924-933
- ◆ McSweeney SJ et al., (2010) Improved cardiac function follows enhanced inflammatory cell recruitment and angiogenesis in 11 β -hydroxysteroid dehydrogenase type 1 deficient mice post-MI. *Cardiovasc Res*, 88, 159-167.
- ◆ Jeanes, HL et al., (2008) Oestrogen-mediated cardioprotection is mimicked by an ER alpha agonist and unaffected by an ER beta antagonist. *J.Endocrinol* 197, 1-10
- ◆ Pepys MP et al. (2006) Targeting C reactive protein for treatment of cardiovascular disease. *Nature* 440:1217-21
- ◆ Clozel, M. et al., (1993) Pathophysiological role of endothelin as revealed by the first orally active endothelin receptor antagonist. *Nature* 365, 759-761

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Dr Peter Henriksen

Consultant Cardiologist, Edinburgh Heart Centre, Honorary Senior Lecturer, University of Edinburgh

Biography



- ◆ Consultant Cardiologist with specialist expertise in percutaneous coronary intervention
- ◆ Wellcome Trust PhD Fellowship, Centre for Inflammation and Repair, University of Edinburgh 1999-2002: Antiproteases and atherosclerosis
- ◆ CSO-NRS Clinician Scientist Fellowship 2012- ongoing support for dedicated research time
- ◆ PI on > £1 million research grant funding from MRC/NIHR to support clinical trial work

Research Interests

- ◆ Neutrophil elastase inhibitor Elafin- collaboration with Proteo Biotech
- ◆ Biomarker detection and imaging of cardiac injury
- ◆ Cancer chemotherapy (anthracycline) related heart muscle injury
- ◆ Clinical trials (translation through to late phase)

Techniques

- ◆ Coronary angioplasty and stenting including pressure wire analysis, rotablation, and chronic total occlusions. Percutaneous renal denervation.
- ◆ Clinical Trials: set up and design
- ◆ Cardiac imaging: Intravascular ultrasound, optical coherence tomography, CT coronary angiography, cardiac MRI

Key publications

- ◆ Stirrat CG, Alam SR, MacGillivray TJ, Gray CD, Dweck MR, Raftis J, et al. Ferumoxytol-enhanced magnetic resonance imaging assessing inflammation after myocardial infarction. *Heart*. 2017 Jun.
- ◆ Alam SR, Lewis SC, Zamvar V, Pessotto R, Dweck MR, Krishan A, et al. Perioperative elafin for ischaemia-reperfusion injury during coronary artery bypass graft surgery: a randomised-controlled trial. *Heart*. 2015 Oct;101(20):1639-45.
- ◆ Gudmundsdottir I, Adamson P, Gray C, Spratt JC, Behan MW, Henriksen P, et al. Optical coherence tomography versus intravascular ultrasound to evaluate stent implantation in patients with calcific coronary artery disease. *Open Heart*. 2015;2(1):e000225.
- ◆ Investigators S-H. CT coronary angiography in patients with suspected angina due to coronary heart disease (SCOT-HEART): an open-label, parallel-group, multicentre trial. *Lancet*. 2015 Mar.

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Dr Patrick Hadoke

Reader, Centre for Cardiovascular Sciences

Director Post-Graduate Student and Early Career Researcher Experience (CMVM)



Biography

- ◆ 28 years' experience investigating mechanisms of arterial remodelling (neointimal proliferation, angiogenesis) in health and disease
- ◆ Manage the Myography and OPT Core Facilities in the Queen's Medical Research Institute
- ◆ Introduced and developed a number of *in vivo* and *ex vivo* models of arterial remodelling, including the use of genetically modified animals
- ◆ Home Office Project Licence Holder for >10 years
- ◆ >£10 million funding for investigation of Cardiovascular Disease
- ◆ Extensive use and development of novel *in vivo* and *ex vivo* imaging techniques for pre-clinical research
- ◆ 23 years undergraduate teaching experience
- ◆ 15 years support for Researcher Career Development

Research Interests

- ◆ The influence of tissue-specific metabolism of glucocorticoids (by 11 β -hydroxysteroid dehydrogenases) on arterial function and structure
- ◆ Mechanisms of atherogenesis, vascular/ valvular calcification and angiogenesis
- ◆ The role of the Wilms Tumour Suppressor in regulating angiogenesis and tissue repair
- ◆ The influence of sex hormones on development of cardiovascular disease
- ◆ Generation of bioartificial blood vessels
- ◆ Critical limb ischaemia

Techniques

- ◆ *In vivo* transgenic and surgical models of atherosclerosis/neointimal proliferation & angiogenesis
- ◆ Functional analysis using small vessel myography
- ◆ *Ex vivo* imaging (Optical Projection Tomography)
- ◆ Histology, cell culture and molecular analyses

Key publications

- ◆ Miller E, Czopek A, Duthie KM, Kirkby NS, Fransen van de Putte EE, Christen S, Kimmitt RA, Castellan R, Kotelevtsev YV, Kuc RE, Davenport AP, Dhaun N, Webb DJ, **Hadoke PWF**. (2017) Influence of smooth muscle cell endothelin B receptors on blood pressure, vascular function and injury-induced neointimal remodelling. *Hypertension*, 69, 275-285.
- ◆ Tura, O, Barclay, G, Samuel, K, Gallagher, R, Skinner, EM, **Hadoke, PWF**, Newby, DE, Turner, ML, Mills, NL (2013) Late outgrowth endothelial cells resemble mature endothelial cells and are not derived from bone marrow. *Stem Cells*, 31 (2), 338-348.
- ◆ Kipari, T, **Hadoke PWF**, Iqbal J, Man T-Y, Miller E, Coutinho A, Sullivan K, Mitic T, Livingstone DEW, Kenyon CJ, Samuel K, White CI, Sheraz S, Blom J, Bouhlei M, Chinetti-Gbaguidi G, Staels B, Andrew R, Walker B, Savill J, Chapman KE, Seckl JR. (2013) 11 β -hydroxysteroid dehydrogenase type 1 deficiency in bone marrow cells reduces atherosclerosis. *FASEB J.*, 26 (4): 1519-31.
- ◆ Small, GR, **Hadoke, PWF**, Sharif, I., Dover AR, Armour, D., Kenyon, CJ, Gray, GA, Walker, BR. (2005) Preventing local regeneration of glucocorticoids by 11 β -hydroxysteroid dehydrogenase type 1 enhances angiogenesis. *PNAS*, 102 (34), 12165-12170.
- ◆ **Hadoke, PWF.**, Christy, C., Kotelevtsev, Y., Williams, B.C., Kenyon, C.J., Seckl, J.R., Mullins, J.J., Walker, B.R. (2001) Endothelial cell dysfunction in mice after transgenic knockout of type 2, but not type 1, 11 β -HSD *Circulation*, 104 (23), 2832-2837.

Dr Mark R. Miller

Senior Research Scientist

Biography



- ◆ >15 years experience in cardiovascular research, with specialism in the cardiovascular effects of air pollution (13 years).
- ◆ Proficiency in preclinical research, with translation to experimental clinical studies.
- ◆ Consistent publication record in high-impact peer-reviewed journals (average impact factor >7.8), and attainment of grant funding from multiple sources (e.g. British Heart Foundation, Natural Environmental Research Council, Medical Research Council, European Union Collaborative Programmes).
- ◆ High level of public engagement, media attention and interaction with policy regulators.
- ◆ Editor of the leading nanoparticle toxicology journal *Particle & Fibre Toxicology* (impact factor: 8.65).
- ◆ Expert Member of the Committee on the Medical Effects of Air Pollution (COMEAP), an independent advisory committee for the UK Government Department of Health.

Research Interests

- ◆ Biological mechanisms for cardiovascular effects of air pollution
- ◆ Potential health risks of manufactured nanomaterials
- ◆ Interventions to ameliorate effects of air pollution (e.g. exhaust particle traps, fuel additives, personal face masks)
- ◆ Vascular function and disease (e.g. atherosclerosis)
- ◆ Nitric oxide pathways and oxidative stress

Techniques

- ◆ Preclinical models of vascular disease, e.g. atherosclerotic Apolipoprotein-E knockout mice
- ◆ *In vivo* skills, e.g. drug administration, pulmonary instillation, fine dissection
- ◆ Myography/organ bath pharmacology
- ◆ Electron paramagnetic resonance (e.g. for free radical generation)
- ◆ Broad spectrum of lab techniques, e.g. histology, ELISAs, absorbance assays, electron microscopy, particle sizing, image analysis.
- ◆ Involvement with experimental clinical studies (e.g. inhalation of particulates in healthy volunteers and patients)
- ◆ Graphic design for scientific literature

Key publications

- ◆ **MILLER MR***, RAFTIS J*, LANGRISH JP, McLEAN SG, SAMUTRTAI P, CONNELL S, WILSON S, VESEY AT, FOKKENS PHB, BOERE AJF, KRYSZEK P, CAMPBELL CJ, HADDOKE PWF, DONALDSON K, CASSEE FR, NEWBY DE, DUFFIN R & MILLS NL (2017). Inhaled nanoparticles accumulate in atherosclerotic lesions. *ACS Nano* 11:4542-4552.
- ◆ STONE V, **MILLER MR**, CLIFT MJD, ELDER A, MILLS NL, MØLLER P, SCHINS RPF, VOGEL U, KREYLING WG, ALSTRUP JENSEN K, KUHLBUSH T, SCHWARZE PE, HOET P, PIETROIUSTI A, DE VIZCAYA-RUIZ A, BAEZA-SQUIBAN A, TRAN L, CASSEE FR (2017). Nanomaterials vs ambient ultrafine particles: an opportunity to exchange toxicology knowledge. *Environmental Health Perspectives* 125:106002.
- ◆ **MILLER MR**, McLEAN SG, DUFFIN R, LAVAL AO, ARAUJO JA, SHAW CA, MILLS NL, DONALDSON K, NEWBY DE & HADDOKE PWF (2013). Diesel exhaust particulate increases the size and complexity of lesions in atherosclerotic mice. *Particle & Fibre Toxicology* 10:61.
- ◆ LANGRISH JP, LI X, WANG S, LEE MM, BARNES GD, LEI GG, **MILLER MR**, CASSEE FR, BOON NA, DONALDSON K, LI J, MILLS NL, JIANG L & NEWBY DE (2012). Reducing particulate air pollution exposure in patients with coronary heart disease improved cardiovascular health. *Environmental Health Perspectives* 120, 367-372.
- ◆ **MILLER MR**, SHAW CA & LANGRISH JP (2012). From particles to patients: oxidative stress and the cardiovascular effects of air pollution. *Future Cardiology* 8, 577-602.
- ◆ **MILLS NL***, **MILLER MR***, LUCKING AJ, BEVERIDGE J, FLINT L, BOERE AJF, FOKKENS PH, BOON NA, DONALDSON K, DUFFIN R, HADDOKE PW, SANDSTROM T, BLOMBERG A, CASSEE FR & NEWBY DE (2011). Inhalation of combustion-derived nanoparticulate impairs vascular function in

Professor David E Newby

British Heart Foundation John Wheatley Chair of Cardiology



Biography

- ◆ Professor of Cardiology
- ◆ Director of the Wellcome Trust Clinical Research Facility
- ◆ Director of the Edinburgh Imaging
- ◆ Consultant Interventional Cardiologist at Royal Infirmary of Edinburgh

Research Interests

- ◆ Coronary Heart Disease, Aortic Stenosis, Heart Failure
- ◆ Experimental Medicine
- ◆ Advanced Cardiovascular Imaging
- ◆ Clinical Trials
- ◆ Air Pollution

Techniques

- ◆ Vascular Models: Forearm plethysmography, Badimon thrombus chamber, invasive and non-invasive haemodynamic monitoring, intravascular ultrasound and OCT
- ◆ Imaging: cardiovascular ultrasound, CT, MRI and PET
- ◆ Health data and record linkage

Key publications

- ◆ Cowell SJ, **Newby DE**, Prescott R, Bloomfield P, Reid JR, Northridge DB, Boon NA. A randomized controlled trial of intensive lipid lowering therapy in patients with calcific aortic stenosis. *N Engl J Med* 2005;352:2389-2397.
- ◆ Mills NL, Törnqvist H, Gonzales M, Vink E, Robinson SD, Söderberg, Boon NA, Donaldson K, Sandström T, Blomberg A, **Newby DE**. Ischemic and thrombotic effects of dilute diesel-exhaust inhalation in men with coronary artery disease. *N Engl J Med* 2007;357:1075-1082.
- ◆ Joshi NV, Vesey AT, Williams MC, Shah ASV, Calvert PA, Craighead FHM, Yeoh SE, Wallace W, Salter D, Fletcher AM, van Beek EJR, Flapan AD, Uren NG, Behan MWH, Cruden NLM, Mills NL, Fox KAA, Rudd JHF, Marc R Dweck MR, **Newby DE**. 18F-Fluoride positron emission tomography identifies ruptured and high-risk coronary atherosclerotic plaques. *Lancet* 2014;383:705-713.
- ◆ The SCOT-HEART Trial Investigators. CT coronary angiography in patients with suspected angina due to coronary heart disease (SCOT-HEART): an open-label, parallel-group, multicentre trial. *Lancet*. 2015;385:2383-91.
- ◆ Vestbo J, Anderson JA, Brook RD, Calverley PMA, Celli BR, Crim C, Martinez F, Yates J, **Newby DE**. Fluticasone furoate and vilanterol and survival in chronic obstructive pulmonary disease with heightened cardiovascular risk. *Lancet* 2016;387:1817-1826.

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Metabolism, Obesity and Diabetes

Dr Cécile Bénézech

Lecturer



Biography

- ◆ 13 years' experience in the study of the immune system
- ◆ World-leading expertise in the study of the immune and inflammatory properties of fat tissues

Research Interests

- ◆ Identification of novel therapeutic targets in the field of peritoneal inflammation
- ◆ Understanding the repair and protective function of visceral fat tissue to refine surgical approaches
- ◆ Identification of novel macrophage therapeutic targets for the treatment of dyslipidaemia

Techniques

- ◆ *In vivo* analysis of immune responses and acute inflammation
- ◆ Analysis of mouse and human immune system by flow-cytometry
- ◆ Imaging of lymphoid and adipose tissues by microscopy

Key publications

- ◆ Jackson-Jones LH, Duncan SM, Magalhaes MS, Campbell SM, Maizels RM, McSorley HJ, Allen JE, **Bénézech C**. (2016) Fat-associated lymphoid clusters control local IgM secretion during pleural infection and lung inflammation. *Nat Commun*. 2016 Sep 1;7:12651
- ◆ **Bénézech C***, Luu NT, Walker JA, Kruglov AA, Loo Y, Nakamura K, Zhang Y, Nayar S, Jones LH, Flores-Langarica A, McIntosh A, Marshall J, Barone F, Besra G, Miles K, Allen JE, Gray M, Kollias G, Cunningham AF, Withers DR, Toellner KM, Jones ND, Veldhoen M, Nedospasov SA, McKenzie AN, Caamaño JH*. (2015) Inflammation-induced formation of fat-associated lymphoid clusters. *Nat Immunol*. 2015 Aug;16(8):819-28
- ◆ **Bénézech C***, Finney BA, Nayar S, Watson S, Caamaño JH, Buckley C, Barone F*. (2014) Impaired Lymph Node Formation in Absence of the C-type Lectin-Like Protein CLEC-2. *Blood*, 2014 Feb 14
- ◆ **Bénézech C***, Mader E, Khan M, Nakamura K, White A, Ware CF, Anderson G and Caamaño JH*. (2012) Lymphotoxin Beta Receptor Signalling through NF- κ B2/RelB Reprograms Adipocyte Precursors to Become Lymph node Stromal Cells. *Immunity*, 2012 Oct 19;37(4):721-34.

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Dr William P Cawthorn

Chancellor's Fellow and MRC Career Development Fellow



Biography

- ◆ 15 years' experience investigating diabetes, obesity and bone health, focusing on adipose tissue. Includes previous research at leading academic and industrial institutions (University of Cambridge, University of Michigan, Eli Lilly). PI at the University of Edinburgh since 2015.
- ◆ Successful track record of securing personal fellowships and research funding (Royal Commission Fellowship, Eli Lilly Innovation Fellowship, MRC Career Development Fellowship)
- ◆ Track record of highly cited, high-impact publications (Cell Metabolism, Nat Comms, JCI, PNAS)
- ◆ Founding member and current Secretary of the International Bone Marrow Adiposity Society

Research Interests

- ◆ Determining the function of bone marrow adipose tissue (BMAT): how does it impact human health and disease?
- ◆ Establishing how caloric restriction improves cardiometabolic health.
- ◆ Dissecting effects of caloric restriction and BMAT on haematopoiesis and immune function
- ◆ Identifying the mechanisms underlying sex differences in the responses to caloric restriction
- ◆ Development of novel imaging methodologies for preclinical and clinical analysis of bone marrow adiposity: is marrow adiposity a novel biomarker for metabolic, skeletal, and/or other diseases? Includes population-level imaging studies (e.g. UK Biobank)

Techniques

- ◆ Mouse models to dissect mechanisms impacting metabolic, skeletal and haematopoietic function.
- ◆ Clinical sample analyses
- ◆ Imaging (micro-CT, PET/CT, MRI)
- ◆ Cell culture and molecular characterisation

Key publications

- ◆ **Cawthorn WP***, Scheller EL, Parlee SD, Pham HA, et al (2016). Expansion of bone marrow adipose tissue during caloric restriction is associated with increased circulating glucocorticoids and not with hypoleptinemia. *Endocrinology* 2016 Feb;157(2):508-21.
- ◆ Scheller EL, Doucette CR, Learman BS, **Cawthorn WP**, et al (2015). Region-specific variation in the properties of skeletal adipocytes reveals regulated and constitutive marrow adipose tissues. *Nat. Communications* 6:7808 (doi:10.1038/ncomms8808).
- ◆ **Cawthorn WP***, Scheller EL, Learman BS, Parlee SD, et al (2014). Bone marrow adipose tissue is an endocrine organ that contributes to increased circulating adiponectin during caloric restriction. *Cell Metabolism* 20(2): 368-375, 2014.

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Prof Karen Chapman

Chair of Molecular Endocrinology



Biography

- ◆ >30 years experience in the field of steroid hormone action with expertise in molecular biology and physiology
- ◆ Wide ranging knowledge and insight of glucocorticoid action: physiology and pathophysiology across a range of disciplines including cardiovascular science, inflammation and early-life programming of later life disease
- ◆ Leadership on a national scale: current General Secretary of the UK-based Society for Endocrinology (to November 2018)
- ◆ Lead academic organiser for >10-year public engagement activity
- ◆ Adjunct Professor at University of Western Australia

Research Interests

- ◆ Glucocorticoid action, with primary focus on glucocorticoid receptor and glucocorticoid metabolism by 11 β -hydroxysteroid dehydrogenase type 1
- ◆ Glucocorticoid action in early life programming of cardiac function and vulnerability to adult cardiac disease
- ◆ Glucocorticoid metabolism and action in shaping immune/inflammatory responses

Techniques

- ◆ Transgenic approaches to investigate glucocorticoid physiology and pathophysiology
- ◆ In vitro cell culture to investigate gene regulation and function
- ◆ Glucocorticoids in inflammation and cardiovascular system; *in vivo* and *in vitro* models.

Key publications

- ◆ Verma, M., Kipari, T.M.J., Man, T.-Y., Forster, T., Homer, N.Z.M., Seckl, J.R., Holmes, M.C., **Chapman, K.E.** (2018) 11 α -HSD1 deficiency alters brain energy metabolism during acute systemic inflammation. *Brain, Behav Immun*, 69, 223-234. PMID 29162555
- ◆ Zhang, Z., Coutinho, A.E., Man T.Y., Kipari, T.M.J., Salter, D.M., Seckl, J.R., Hadoke, P.W.F. **Chapman, K.E.** (2017) Macrophage 11 β -HSD1 deficiency promotes inflammatory angiogenesis. *J Endocrinol* 234:291-299. PMID 28676523
- ◆ Richardson, R.V., Batchen, E.J., Darroch, R., Pan, X., Rog-Zielinska, E.A., Wyrzykowska, W., Scullion, K., Thomson, A.J.W., Al-Dujaili, E.A.S., Diaz, M.E., Moran, C.M., Kenyon, C.J., Gray, G.A., **Chapman, K.E.** (2017) Cardiovascular glucocorticoid receptor deficiency causes systolic dysfunction and cardiac fibrosis. *J. Endocrinol.*, 232, 437-450. PMID 28057868
- ◆ Rog-Zielinska, E.A., Craig, M.-A., Manning, J.R., Richardson, R.V., Gowans G.J., Dunbar, D.R., Ghrabi, K., Kenyon, C.J., Holmes, M.C., Hardie, D.G., Smith G.L., **Chapman K.E.** (2015) Glucocorticoids promote structural and functional maturation of fetal cardiomyocytes: a role for PGC1 β . *Cell Death Diff*, 22, 1106-1116. PMID 25361084

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Dr You-Ying Chau

ESAT Fellow



Biography

- ◆ Postdoc training: MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine, University of Edinburgh
- ◆ PhD: University of Edinburgh
- ◆ MSc: University of Waikato (NZ)
- ◆ BSc (Tech): University of Waikato (NZ)

Research Interests

- ◆ Adipose tissue origin(s), development, and heterogeneity
- ◆ Regulatory mechanisms of adipose tissue
- ◆ Stem cell biology
- ◆ Developmental biology

Techniques

- ◆ Mouse genetics/mouse models
- ◆ Ranges of molecular/cell biology techniques

Key publications

- ◆ McHaffie, S., and **Chau, YY*** (2016). Methods in molecular biology 1467, 73-80, 2016.
- ◆ Cleal, L., and **Chau, YY*** Methods in molecular biology 1467, 81-91, 2016.
- ◆ Cano, E., Carmona, R., Ruiz-Villalba, A., Rojas, A., **Chau, YY**, Wagner, K.D., Wagner, N., Hastie, N.D., Munoz-Chapuli, R., and Perez-Pomares, J.M. Proceedings of the National Academy of Sciences of the United States of America 113, 656-661, 2016.
- ◆ Kaiser V, Svinti V, Prendergast J, **Chau YY**.et al. Human Molecular Genetics 24, 5464-54748, 2015.
- ◆ Lee M, Downes D, **Chau YY**, Serrels B, Ellfick, A, Hastie N, Brunton V, Frame M, Serrels A. IntraVital Epub 8/06/15
- ◆ **Chau YY*** & Hastie N*. Wt1, the mesothelium and the origins and heterogeneity of visceral fat progenitors. Invited commentary. Adipocyte (Published online: 29 Jan 2015).
- ◆ **Chau YY***, Bandiera R, Serrels A, Martinez Estrada OM, Qing W, Lee M, Slight J, Thornburn A, Berry R, McHaffie S, Stimson RH, Walker BR, Muñoz Chapuli R, Schedl A, Hastie H*. Nat Cell Biology 16, 367–375, 2014.
- ◆ Velecela V, Lettice LA, **Chau YY**, Slight J, Berry RL, Thornburn A, Gunst QD, van den Hoff M, Reina M, Martínez FO, Hastie ND, Martínez-Estrada OM. Hum Mol Genet. 2013 Dec 20;22(25):5083-95.

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Dr Amanda Drake

Reader and Honorary Consultant in Paediatric Endocrinology



Biography

- ◆ 18 years of experience in research in metabolism and epigenetics with expertise in animal models
- ◆ Experience in human studies, particularly in children and pregnancy
- ◆ Successful Personal Fellowship funding - British Heart Foundation Clinical Research Fellowship, MRC Clinician Scientist Fellowship and Scottish Senior Clinical Fellowship. Ongoing MRC, Wellcome Trust and BHF funding
- ◆ 12 years as a PI in the Centre for Cardiovascular Science
- ◆ 11 years' experience as a Consultant in Paediatric Endocrinology, Royal Hospital for Sick Children, Edinburgh

Research Interests

- ◆ My overarching interest is the role of the epigenome in disease:
 - The role of the epigenome in early life origins of cardiometabolic and neurodevelopmental disease – particularly as a consequence of maternal obesity/diabetes and fetal glucocorticoid overexposure
 - The role of the epigenome in mediating the long term effects of preterm birth on cardiovascular health and neurodevelopment
 - The interaction between dysregulated metabolism and the epigenome in obesity and diabetes, with a focus on non-alcoholic fatty liver disease

Techniques

- ◆ Epigenetic profiling
- ◆ Animal models of metabolic disease
- ◆ *In vitro* models of non-alcoholic fatty liver disease

Key publications

- ◆ Lyall MJ, Cartier J, Cameron K, Dunn W, Meehan RM, Hay DC, **Drake AJ**. Human ESCell-derived hepatocytes as a novel model for non-alcoholic fatty liver disease. *Philosophical Transactions B* 2018 (in press)
- ◆ Cartier J, Smith T, Thomson JP, Rose CM, Khulan B, Heger A, Meehan RR, **Drake AJ**. Investigation into the role of the germline epigenome in the transmission of glucocorticoid-programmed effects across generations. *Genome Biology* 2018;19:50 doi:10.1186/s13059-018-1422-4
- ◆ Sparrow S, Manning JR, Cartier J, Anblagan D, Bastin ME, Piyasena C, Pataky R, Moore EJ, Semple SI, Wilkinson AG, Evans M, **Drake AJ***, Boardman JP*. Epigenomic profiling of preterm infants reveals DNA methylation differences at sites associated with neuronal function. *Translational Psychiatry* 2016; Jan 19;6:e716. *joint senior author

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Dr Shareen Forbes

Reader in Diabetes, Lead Physician and Principle Investigator Islet Transplant Programme, Scotland



Biography

- ◆ 20 years experience in the field of Diabetes and Endocrinology
- ◆ Academic track record with personal clinical fellowships at PhD (Novo Nordisk UK Foundation) and intermediate levels (Diabetes UK)
- ◆ Experience in conducting randomised controlled trials and clinical cohort studies in man
- ◆ Expertise in medical statistics
- ◆ Parallel translational studies in laboratory with expertise in rodent models at the University of Edinburgh

Research Interests

- ◆ Use of cell therapies (eg. mesenchymal stromal cells) and novel therapeutics in islet transplantation for Type 1 diabetes - their impact on glycaemic control and mechanism of action
- ◆ Developing bioengineering tools to assess islet release criteria in order to optimise islet transplantation outcomes
- ◆ Beta and alpha cell dysfunction in Type 1 diabetes
- ◆ Pathogenesis of Type 1 and Type 2 diabetes
- ◆ Use of novel tracers combined with imaging modalities including PET, to assess islet mass and function in man and animal models
- ◆ Effect of different therapies in diabetes and impact on progression of complications of disease

Techniques

- ◆ Induction of diabetes in rodent models
- ◆ Transplantation of islets in mice using intraportal and kidney capsule and subcutaneous routes
- ◆ Whole body *in vivo* metabolism and metabolic disease in man and rodents using tracer-based methodologies
- ◆ Assessment of insulin sensitivity and secretion in man and rodent models
- ◆ Isolation of islets and *in vitro* metabolic assessments

Key publications

- ◆ Validation of the BETA-2 Score: An Improved Tool to Estimate Beta Cell Function After Clinical Islet Transplantation Using a Single Fasting Blood Sample. **Forbes, S.**, .. Shapiro, A. M. J. & Senior, P. A. Sep 2016. *American Journal of Transplantation*. 16, 9
- ◆ Functionalized superparamagnetic iron oxide nanoparticles provide highly efficient iron-labelling in macrophages for magnetic resonance-based detection *in vivo*. Sharkey, J., .. Forbes, S...**Forbes, S.J.** Apr 2017. *Cytotherapy*. 19, 4, p. 555-569
- ◆ Islet transplantation from a nationally funded UK centre reaches socially deprived groups and improves metabolic outcomes. **Forbes, S.**, et al. Jun 2015. *Diabetologia*. 58, 6, p. 1300-1308
- ◆ Suppression of Epithelial to Mesenchymal Transitioning (EMT) Enhances *Ex Vivo* Reprogramming of Human Exocrine Pancreatic Tissue towards Functional Insulin Producing β -Like Cells. Lima, M. J., ..**Forbes, S.**, Heimberg, .. Docherty, K. Aug 2013 In : *Diabetes*. 62, 8, p. 2821-2833 13

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Prof Margarete MS Heck

Chair of Cell Biology and Genetics



Biography

- ◆ Born in Munich, raised in upstate New York. BA in Biology/Microbiology from SUNY Plattsburgh.
- ◆ Fulbright Fellow (EMBL Heidelberg), PhD (Johns Hopkins University), Postdoctoral Fellow (Carnegie Institution of Washington), Assistant Professor (Johns Hopkins University).
- ◆ Migrated to the University of Edinburgh in 1996: Wellcome Senior Research Fellow at the College of Science & Engineering, Wellcome University Award at the College of Medicine & Veterinary Medicine (Professor of Cell Biology and Genetics from 2006).
- ◆ 25 years independent PI experience with expertise in cell biology, genetics and biochemistry. Preference to utilise metazoan models (*Drosophila*, zebrafish) as the starting point for the identification of novel molecules necessary for human physiology and disease progression.
- ◆ Director of Postgraduate Studies for the Deanery of Clinical Sciences (Edinburgh Medical School) – following management of the Wellcome 4-yr PhD programme in the Cellular and Molecular Basis of Disease, and the MSc by Research in Biomedical Sciences.

Research Interests

- ◆ Chromosome structure, cell division, cell migration
- ◆ Use of model systems (*Drosophila*, zebrafish) to exploit genetics for the discovery of novel, essential components conserved in higher eukaryotes (like us)
- ◆ Elucidation of the mechanism of action of invadolysin – a novel metalloprotease identified in the Heck group. Though originally discovered from the study of a lethal mitotic mutation affecting chromosome structure in fruit flies, the enzyme is conserved and present in human serum
- ◆ Understanding the function of poly, a novel regulator of insulin signalling (also discovered in the Heck group)
- ◆ Keen interest in fostering the careers of junior scientists – manifest through numerous roles in postgraduate education and postdoctoral mentoring

Techniques

- ◆ General husbandry and genetic screening of *Drosophila*.
- ◆ Phenotyping of genetic mutant alleles.
- ◆ Fluorescence microscope imaging of cellular components.
- ◆ Generation and characterization of antibodies.
- ◆ Juggling (metaphorically): scientific career in academia, two children, and a long-term marriage.

Key publications

- ◆ Chang, CW, Abhinav, K, Di Cara, F, Panagakou, I, Vass, S and **MMS Heck**. (2016). A role for the metalloprotease invadolysin in insulin signaling and adipogenesis. *Biol Chem*. Sept 13, [Epub ahead of print].
- ◆ Rao, SG, Janiszewski, MM, Duca, E, Nelson, B, Abhinav, K, Panagakou, I, Vass, S, and **MMS Heck**. (2015). Invadolysin acts genetically via the SAGA complex to modulate chromosome structure. *Nucleic Acids Research* 43, 3546-3562.
- ◆ Vass, S, and **MMS Heck**. (2013). Perturbation of invadolysin disrupts cell migration in zebrafish (*Danio rerio*). *Experimental Cell Research* 319, 1198-1212.
- ◆ Di Cara, F, Duca, E, Dunbar, DR, Cagney, G, and **MMS Heck**. (2013). Invadolysin, a conserved lipid-droplet-associated metalloproteinase, is required for mitochondrial function in *Drosophila*. *Journal of Cell Science* 126, 4769-4781.
- ◆ Bolukbasi, E, Vass, S, Cobbe, N, Nelson, B, Dunbar, D, Simossis, V, and **MMS Heck**. (2012) *Drosophila* Poly suggests a novel role for the Elongator Complex in Insulin Receptor/TOR Signaling. *Open Biology*. 2:110031
- ◆ Cobbe, N, Marshall, KM, Rao, SG, Chang, CW, Di Cara, F, Duca, E, Vass, S, Kassan, A, and **MMS Heck**. (2009). The conserved metalloprotease invadolysin localizes to the surface of lipid droplets. *Journal of Cell Science* 122, 3414-3423.
- ◆ McHugh, B, Krause, SA, Yu, B, Deans, AM, Heasman, S, McLaughlin, P, and **MMS Heck**. (2004). Invadolysin: a novel, conserved metalloprotease links mitotic structural rearrangements with cell migration. *J Cell Biol* 167, 673-686.

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Dr Dawn Livingstone

Lecturer, Biomedical Sciences



Biography

- ◆ 18 years' experience in academia – post-doctoral research fellow then lecturer at University of Edinburgh

Research Interests

- ◆ Role of steroid metabolism in metabolic risk
- ◆ Impact of altered steroid metabolism on behaviour
- ◆ Pharmacology of steroid metabolites

Techniques

- ◆ *In vivo* metabolic phenotyping
- ◆ High throughput qPCR
- ◆ Mass spectrometry

Key publications

- ◆ Quantification of 11β -hydroxysteroid dehydrogenase 1 kinetics and pharmacodynamic effects of inhibitors in brain using mass spectrometry imaging and stable-isotope tracers in mice. Cobice DF, **Livingstone DE**, McBride A, MacKay CL, Walker BR, Webster SP, Andrew R. *Biochem Pharmacol.* 2018 Feb;148:88-99. PMID: 29248595
- ◆ Safer topical treatment for inflammation using 5α -tetrahydrocorticosterone in mouse models. Gastaldello A, **Livingstone DE**, Abernethie AJ, Tsang N, Walker BR, Hadoke PW, Andrew R. *Biochem Pharmacol.* 2017 Apr 1;129:73-84. PMID: 28131845
- ◆ Metabolic dysfunction in female mice with disruption of 5α -reductase 1. **Livingstone DE**, Di Rollo EM, Mak TC, Sooy K, Walker BR, Andrew R. *J Endocrinol.* 2017 Jan;232(1):29-36. PMID: 27647861
- ◆ 5α -Reductase type 1 deficiency or inhibition predisposes to insulin resistance, hepatic steatosis, and liver fibrosis in rodents. **Livingstone DE**, Barat P, Di Rollo EM, Rees GA, Weldin BA, Rog-Zielinska EA, MacFarlane DP, Walker BR, Andrew R. *Diabetes.* 2015 Feb;64(2):447-58. PMID: 25239636

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Dr Zoi Michailidou

Edinburgh Scientific Academic Track Fellow



Biography

- ◆ 12 years experience in the field of metabolic disease with expertise in physiology and nutrition, metabolism of animal models and tissue culture models.
- ◆ Career track Fellowship (personal awards held: Wellcome Trust; Sir Henry Wellcome PostDoctoral Fellowship, BHF/Edinburgh Univ transition Fellowship, ESAT Tenure Track FShip)
- ◆ Track record of high-impact & top-specialist publications (Hepatology, Diabetes, Nature Medicine)
- ◆ Reviewer for journals (Nature Metabolism, Cancer Research, Scientific Reports, Genomic Endocrinology) and funding bodies (MRC, BHF).

Research Interests

- ◆ Mechanisms of adipose tissue regulation
- ◆ Mechanisms of lipid signalling regulation
- ◆ Metabolic disease susceptibility; with emphasis to obesity/type 2 diabetes and fatty liver
- ◆ Mechanisms of oxygen regulation in disease
- ◆ Identification of metabolic beneficial outcomes using compounds with re-purposing potential

Techniques

- ◆ Transgenic models of metabolic disease/oxygen regulation
- ◆ Mouse Models of obesity, fatty liver, type 2 diabetes
- ◆ *In vivo / vitro* hypoxia signalling; *In vivo / vitro* lipid signalling
- ◆ Whole animal physiology and metabolic disease; tissue oxygenation

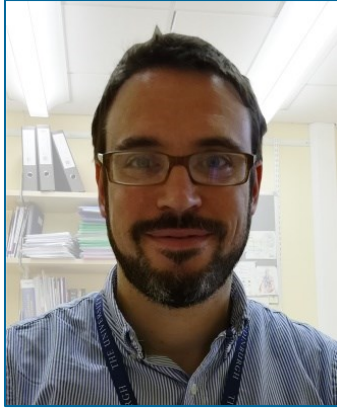
Key publications

- ◆ Zou X, Ramachandran P et al... **Michailidou Z** (2018) *Hepatology*. 11Beta-hydroxysteroid dehydrogenase-1 deficiency or inhibition enhances hepatic myofibroblast activation in murine liver fibrosis.
- ◆ Morton NM, Beltram J, Carter RN, **Michailidou Z**, et al. (2016) *Nature Medicine*. Genetic identification of thiosulfate sulfurtransferase as an adipocyte-expressed antidiabetic target in mice selected for leanness.
- ◆ **Michailidou Z**, Morton NM, Moreno Navarrete JM et al (2015) *Diabetes*. Adipocyte pseudohypoxia suppresses lipolysis and facilitates benign adipose tissue expansion.
- ◆ **Michailidou Z**, Turban S, Miller E et al. (2012) *Journal of Biol Chem*. Increased angiogenesis protects against adipose hypoxia and fibrosis in metabolic disease-resistant 11 β -hydroxysteroid dehydrogenase type 1 (HSD1)-deficient mice.

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Dr. James E. N. Minchin

Research Fellow



Biography

- ◆ 8 years experience of using zebrafish to study disease mechanisms
- ◆ Extensive experience of conducting *in vivo* forward and reverse chemical and genetic screens in zebrafish
- ◆ Publication of 16 primary research articles; including in *Development*, *Disease Models & Mechanisms*, *PNAS*, *Endocrinology*, *Journal of Lipid Research*, *Frontiers in Endocrinology*

Research Interests

- ◆ Genetic regulation of adiposity traits (e.g., early-onset and adult obesity)
- ◆ Genetic variation in the non-coding genome underlying adipose-related disease
- ◆ Adipose tissue homeostasis and ageing
- ◆ Microenvironment control of adipose morphology
- ◆ Effects of adipose tissue on neighbouring organs (e.g., pancreas and heart)

Techniques

- ◆ Generation and use of zebrafish disease models
- ◆ Forward and reverse genetic screens in zebrafish
- ◆ Chemical screens in zebrafish
- ◆ Deep phenotyping, machine learning and statistical models to study adiposity traits

Key publications

- ◆ **Minchin, J. E.**, Scahill, C. M., Staudt, N., Busch-Nentwich, E. M., and Rawls, J. F. 2018. Deep phenotyping in zebrafish to identify genetic and diet induced changes in adiposity. *Journal of Lipid Research*. In Press.
- ◆ **Minchin, J. E.**, and J. F. Rawls. 2017. A classification system for zebrafish adipose tissues. *Disease Models & Mechanisms*. 10:797-809.
- ◆ **Minchin, J. E.**, I. Dahlman, C. J. Harvey, N. Mejhert, M. K. Singh, J. A. Epstein, P. Arner, J. Torres-Vazquez, and J. F. Rawls. 2015. Plexin D1 determines body fat distribution by regulating the type V collagen microenvironment in visceral adipose tissue. *Proc Natl Acad Sci U S A* 112: 4363-4368.

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Dr Ruth Morgan

Wellcome Trust Clinical Career Development Fellow and Lecturer in Equine Practice



Biography

- ◆ Veterinary researcher

Research Interests

- ◆ Glucocorticoid metabolism and signalling
- ◆ Obesity and cardiovascular risk and hypertension
- ◆ Comparative biology
- ◆ Equine endocrinology

Techniques

- ◆ *In vitro* cell techniques
- ◆ Molecular biology
- ◆ Mass spectrometry
- ◆ Myography
- ◆ Clinical studies in horses

Key publications

- ◆ **Morgan RA**, Beck KR, Nixon M, Homer NZM, Crawford AA, Melchers D, Houtman R, Meijer OC, Stomby A, Anderson AJ, Upreti R, Stimson RH, Olsson T, Michoel T, Cohain A, Ruusalepp A, Schadt EE, Björkegren JLM, Andrew R, Kenyon CJ, Hadoke PWF, Odermatt A, Keen JA, Walker BR. Carbonyl reductase 1 catalyzes 20 β -reduction of glucocorticoids, modulating receptor activation and metabolic complications of obesity. *Sci Rep* 2017; 7.
- ◆ **Morgan RA**, Keen JA, Walker BR and Hadoke PW. Vascular dysfunction in horses with endocrinopathic laminitis. *Plos One* 2016 11 (9), e0163815
- ◆ Nixon M, Mackenzie SD, Taylor AI, Homer NZM, Livingstone DE, Mouras R, **Morgan RA**, Mole DJ, Stimson RH, Reynolds RM, Elfick APD, Andrew R, Walker BR. ABCC1 confers tissue-specific sensitivity to cortisol versus corticosterone: A rationale for safer glucocorticoid replacement therapy. *Science Translational Medicine* 2016;8:(352ra109)

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Professor Nik Morton

Chair of Molecular Metabolism



Biography

- ◆ 20 years' experience in the field of metabolic disease with expertise in physiology, genetics and metabolism of animal models.
- ◆ Successful Personal Fellowship funding career track (successive Wellcome Trust Intermediate and Career Development Fships, RCUK Tenure Track FShip, Wellcome Trust Investigator Award)
- ◆ Track record of high impact publications (Science, JCI, PNAS, Diabetes, Nature Medicine)
- ◆ Reviewer for top tier journals (Cell, Diabetes, Journal of Clinical Endocrinology and Metabolism, Endocrinology, etc) and funding bodies (Wellcome Trust, MRC, BBSRC, Diabetes UK, BHF)

Research Interests

- ◆ Genetic mechanisms regulating adiposity and metabolic disease susceptibility and resistance
- ◆ Cellular and whole animal energetics
- ◆ New gene target identification and mechanistic modelling in *in vivo* animal models with translational follow up

Techniques

- ◆ Transgene modelling of metabolic disease
- ◆ Whole animal physiology of metabolism and metabolic disease; tracer-based glucose homeostasis
- ◆ Whole animal and cellular energetics; *in vivo* indirect calorimetry and *in vitro* mitochondrial/cellular energetics
- ◆ Cell signalling and mechanisms of insulin resistance/sensitivity; *in vivo* and *in vitro* models

Key publications

- ◆ Complement factor B is a determinant of both metabolic and cardiovascular features of the metabolic syndrome. *Hypertension*. In press June 2017. Coan, P., Barrier, M., Alfazema, N. Carter, N, Marion de Procé, S., Dopico, X, Garcia Diaz, A, Thomson, A, Jackson-Jones, L., Moyon, B., Webster, Z., Ross, D., Moss, J., Arends, M., **Morton, N.M.**, Aitman, T.
- ◆ **Morton, NM***, Beltram, J, Carter, RN et al. Genetic identification of an adipocyte expressed anti-diabetic target in mice selected for leanness. *Nat Med* 2016 DOI: 10.1038/nm.4115 2016.
- ◆ Ramage LE, Akyol M, Fletcher AM, Forsythe J, Nixon M, Carter RN, van Beek EJ, **Morton NM**, Walker BR, Stimson RH. Glucocorticoids Acutely Increase Brown Adipose Tissue Activity in Humans, Revealing Species-Specific Differences in UCP-1 Regulation. *Cell Metab*. 2016 24(1):130-41.

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Dr Mark Nixon

British Heart Foundation Intermediate Research Fellow



Biography

- ◆ 10 years' experience in rodent models of obesity, insulin resistance and type 2 diabetes
- ◆ Extensive experience in glucocorticoid action in metabolic tissues, including adipose tissue, liver, skeletal muscle and bone
- ◆ Local and international collaboration network including endocrine clinicians and world-leaders in steroid hormone biology
- ◆ Track record of publishing original, first author publications in high impact journals with translational elements

Research Interests

- ◆ Identification of pathways regulating delivery of steroid hormones to tissues
- ◆ Focus on the role of neutrophil elastase and corticosteroid binding globulin in regulating glucocorticoid delivery to adipose tissue under obese conditions of obesity
- ◆ Identifying novel therapeutic targets amenable to drug discovery to allow control of tissue steroid exposure

Techniques

- ◆ *In vivo* rodent models of inflammation, obesity and insulin resistance
- ◆ *In vitro* primary cell culture models of rodent and human adipocytes
- ◆ *Ex vivo* imaging of protease activity using fluorescent readouts
- ◆ Plasma and tissue steroid measurements using liquid chromatography-tandem mass spectrometry
- ◆ Tissue mRNA and protein expression

Key publications

- ◆ Morgan RA, Beck K, **Nixon M**, Homer NZ, Meijer O, Crawford A, Olsson T, Stomby A, Anderson A, Upreti R, Stimson R, Andrew R, Hadoke PWF, Odermatt A, Keen JA, Walker BR. (2017). Carbonyl reductase 1 and 20 β -dihydro-cortisol; a functionally significant cortisol metabolism pathway dysregulated in obesity. *Sci Rep*, 7(1)
- ◆ **Nixon M**, MacKenzie SD, Taylor AI, Homer NZ, Livingstone DE, Mouras R, Stimson R, Reynolds R, Elfick A, Andrew R, Walker BR. (2016). ABCC1 confers adipose tissue sensitivity to cortisol over corticosterone. *Sci Transl Med*, 8(352).
- ◆ Ramage LE, Akyol M, Fletcher A, Forsythe J, **Nixon M**, Carter RE, van Beek EJ, Morton NM, Walker BR, Stimson RH. (2016). Glucocorticoids increase brown adipose tissue activity in humans, revealing species-specific differences in UCP1 regulation. *Cell Metab*, 24(1):130-141.
- ◆ **Nixon M**, Andrew R, Chapman KE (2013). It takes two to tango: dimerisation of glucocorticoid receptor and its anti-inflammatory functions. *Steroids*. 78(1):59-68
- ◆ **Nixon M**, Wake DJ, Livingstone DEW, Stimson RH, Esteves CL, Seckl, JR, Chapman KE, Andrew R, Walker BR. (2011). Salicylate down-regulates expression of 11 β HSD1 in adipose tissue in obese mice and in humans, mediating insulin sensitisation. *Diabetes*. 61(4):790-6
- ◆ **Nixon M**, Upreti R, Andrew R. (2011). 5 α -Reduced Glucocorticoids - A Story of Natural Selection. *J Endocrinol*. 212(2):111-27

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Professor Rebecca M Reynolds

Chair of Metabolic Medicine and Honorary Consultant in Diabetes & Endocrinology



Biography

- ◆ Clinical academic with 18 years' experience of clinical research
- ◆ Nick Hales Award at International Society for Developmental Origins of Health and Disease, 2011
- ◆ Curt Richter Award at International Society for Psychoneuroendocrinology, 2012.
- ◆ Presidential Prize Society for Reproductive Investigation, 2015.
- ◆ Queen's Anniversary Prize Award to University of Edinburgh for 'Clinical Innovations to respond to major unmet needs in women's health' (contributed work on obesity in pregnancy), 2018.
- ◆ RD Lawrence Award Diabetes UK 2019

Research Interests

- ◆ Developmental origins of health disease
- ◆ Pregnancy 'stressors' including Obesity, Diabetes, Mental Health and Preterm Birth
- ◆ Glucocorticoids in pregnancy and transfer to the fetus
- ◆ Global health

Techniques

- ◆ Experimental medicine
- ◆ Clinical trials in pregnancy
- ◆ Big data

Key publications

- ◆ **Reynolds RM**, Allan KM, Raja EA, Bhattacharya S, McNeill G, Hannaford PC, Sarwar N, Lee AJ, Bhattacharya S, Norman JE. Maternal obesity during pregnancy and premature mortality from cardiovascular event in adult offspring: follow-up of 1 323 275 person years. *British Medical Journal* 2013;347:f4539 doi: 10.1136/bmj.f4539
- ◆ Chiswick C, **Reynolds RM**, Denison F, Drake AJ, Forbes SJ, Newby DE, Walker BR, Quenby S, Wray S, Weeks A, Lashen H, Rodriguez A, Murray G, Whyte S, Norman JE. Metformin and maternal and fetal outcomes in obese pregnant women (EMPOWaR): a randomised double blind placebo controlled trial. *Lancet Diabetes & Endocrinology* 2015;pii: S2213-8587(15)00219-3
- ◆ Lee KK, Raja EA, Lee AJ, Bhattacharya S, Bhattacharya S, Norman JE, **Reynolds RM**. Maternal Obesity during Pregnancy Associates with Premature Mortality and Major Cardiovascular Events in Later Life. *Hypertension* 2015 66(5):938-44
- ◆ Horikoshi M,.....**Reynolds RM** (author 94 of 165)....on behalf of the Early Growth Genetics (EGG) Consortium) Genetic studies of birthweight give biological insights into links with adult disease. *Nature* 2016 538(7624):248-252
- ◆ Stirrat LI, Sengers BG, Norman JE, Homer NZM, Andrew R, Lewis RM, **Reynolds RM**. Transfer and Metabolism of Cortisol by the Isolated Perfused Human Placenta. *Journal of Clinical Endocrinology & Metabolism*. 2018 103(2):640-648.

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Professor Robert K. Semple

Chair of Translational Molecular Medicine



Biography

- ◆ Clinician scientist combining clinical practice as honorary consultant diabetologist/endocrinologist with 16 years of experience of research into mechanisms underlying human insulin resistance and related disorders
- ◆ Discovered 10 novel human genetic disorders, and translated findings into novel NHS clinical services
- ◆ Serially Wellcome Trust Funded since 2002

Research Interests

- ◆ Human monogenic disorders of adipose remodelling and/or insulin action
- ◆ Developing of precision therapies for rare metabolic diseases of defined aetiology
- ◆ Comparing rare disease of known aetiology with pandemic metabolic disease of unknown aetiology to make inferences about human disease mechanism
- ◆ Improving relevance to human disease of cell and animal genetic models

Techniques

- ◆ Human genetics and genomics
- ◆ Experimental medicine focused on insulin resistance/metabolic disease
- ◆ Cellular disease modelling, including human stem cell-based models, with particular focus on insulin signalling and adipocyte development/function
- ◆ Murine genetic disease modelling

Key publications

- ◆ Brierley GV, Siddle K, **Semple RK**. Diabetologia. Evaluation of anti-insulin receptor antibodies as potential novel therapies for human insulin receptoropathy using cell culture models. 2018 Apr 27. doi: 10.1007/s00125-018-4606-2. PMID: 29700562
- ◆ Rocha N, Bulger DA, Frontini A, ..[24 authors].. Maher ER, Richelsen B, Savage DB, **Semple RK**. Human biallelic MFN2 mutations induce mitochondrial dysfunction, upper body adipose hyperplasia, and suppression of leptin expression. *Elife*. 2017 Apr 19;6. pii: e23813. PMID: 28414270
- ◆ Payne F, Colnaghi R, Rocha N, Seth A, ..[9 authors].. Barroso I, O'Driscoll M, **Semple R**. Hypomorphism in human NSMCE2 linked to primordial dwarfism and insulin resistance. *J Clin Invest*. 2014 Sep;124(9):4028-38. PMID: 25105364
- ◆ Weedon MN, Ellard S, Prindle MJ, ..[16 authors].. Loeb LA, **Semple RK**, Hattersley AT. An in-frame deletion at the polymerase active site of POLD1 causes a multisystem disorder with lipodystrophy. *Nat Genet*. 2013 Aug;45(8):947-50. PMID: 23770608
- ◆ Lindhurst MJ, Parker VE, Payne F, ..[21 authors].. Barroso I, Biesecker LG, **Semple RK**. Mosaic overgrowth with fibroadipose hyperplasia is caused by somatic activating mutations in PIK3CA. *Nat Genet*. 2012 Jun 24;44(8):928-33. PMID: 22729222

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Dr Roland Stimson

Scottish senior clinical academic fellow and honorary consultant physician



Biography

- ◆ Clinical researcher with 15 years research experience in human metabolic disease
- ◆ Consultant physician undertaking clinics in type 1 diabetes, general endocrinology and congenital adrenal hyperplasia
- ◆ Expertise in human experimental medicine/ integrative physiology
- ◆ Current holder of a CSO-funded Scottish Senior Clinical Academic fellowship investigating the regulation of human brown adipose tissue

Research Interests

- ◆ Adipose tissue physiology
- ◆ Energy metabolism/ brown adipose tissue thermogenesis
- ◆ Glucocorticoid biology
- ◆ Congenital adrenal hyperplasia

Techniques

- ◆ *In vivo* imaging (e.g. PET/ thermal imaging)
- ◆ Microdialysis
- ◆ Selective venous cannulation
- ◆ Adipose tissue collection
- ◆ Stable isotope tracers
- ◆ Primary cell culture

Key publications

- ◆ Weir G, Ramage LE, Akyol M, Rhodes JK, Kyle CJ, Fletcher AM, Craven TH, Wakelin SJ, Drake AJ, Gregoriades ML, Ashton C, Weir N, van Beek EJR, Karpe F, Walker BR, **Stimson RH** (2018) Substantial metabolic activity of human brown adipose tissue during warm conditions and cold-induced lipolysis of local triglycerides. *Cell Metabolism* (in press).
- ◆ Ramage LE, Akyol M, Fletcher AM, Forsythe J, Nixon M, Carter RN, van Beek EJR, Morton NM, Walker BR, **Stimson RH** (2016) Glucocorticoids acutely increase brown adipose tissue activity in humans, revealing species-specific differences in UCP-1 regulation. *Cell Metabolism* 24; 1: 130-41.
- ◆ **Stimson RH**, Anderson AJ, Ramage LE, de Beaux AC, Tulloh B, Mole DP, Andrew R, Walker BR (2017) Acute physiological effects of glucocorticoids on fuel metabolism in humans are permissive but not direct. *Diabetes, Obesity and Metabolism* 19(6):883-91.

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Professor Scott P Webster

Chair of Medicines Discovery



Biography

- ◆ 18 years' experience in drug discovery and development in industry and academia – established drug discovery activities at College of Medicine & Veterinary Medicine
- ◆ >£10 million funding raised for medicines discovery
- ◆ Broad experience across disciplines and therapeutic areas
- ◆ Track record of success: UE2343 (Xanamem) in Phase 2 for Alzheimer's Disease, GSK33350065 in Phase 1 for acute pancreatitis

Research Interests

- ◆ Identification of novel therapeutic targets and their translation into drug discovery
- ◆ Development of novel *in vitro* screening techniques
- ◆ Small molecule drug design
- ◆ Protein biochemistry with a particular focus on enzymes

Techniques

- ◆ Protein expression
- ◆ *In vitro* screening – cellular and target-based using fluorescence readouts
- ◆ *In vitro* DMPK
- ◆ Mass spectrometry

Key publications

- ◆ Hutchinson JP, Rowland P, Taylor MRD, Christodoulou EM, Haslam C, Hobbs CM, Holmes D, Homes P, Liddle J, Mole DJ, Uings I, Walker AL, **Webster SP**, Mowat CG, Chung C (2017) Structural and mechanistic basis of differentiated inhibitors of the acute pancreatitis target kynurenine 3-monooxygenase. *Nat Commun*, 8: 15827.
- ◆ **Webster SP**, McBride A, Binnie M, Sooy K, Seckl JR, Andrew R, Pallin TD, Hunt HJ, Perrior TR, Ruffles VS, Ketelbey JW, Walker BR (2017) Selection and early clinical evaluation of the brain-penetrant 11 β -hydroxysteroid dehydrogenase type 1 (11 β -HSD1) inhibitor UE2343 (XanamemTM) *Br J Pharmacol*, 174: 396-408.
- ◆ Mole DJ, **Webster SP**, Uings I, Zheng X, Binnie M, Wilson K, Hutchinson JP, Mirguet O, Walker A, Beauflis B, Ancellin N, Trottet L, Bénétou V, Mowat CG, Wilkinson M, Rowland P, Haslam C, McBride A, Homer NZ, Baily JE, Sharp MG, Garden OJ, Hughes J, Howie SE, Holmes DS, Liddle J, Iredale JP. (2016) Inhibition of kynurenine-3-monooxygenase activity protects against multiple organ failure in rodent models of severe acute pancreatitis. *Nat Med*, 22: 202-209.

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Hypertension & Renal

Professor Matthew A Bailey

Chair of Renal Physiology



Biography

- ◆ Career total of >£2.5M of research funding and >£7M of Postgraduate funding.
- ◆ 73 peer-reviewed publications (35 since 2012); 10 book chapters (7 since 2012).
- ◆ H-index of 27, with >2200 citations (1300 since 2013).
- ◆ Fellow of the Royal Society of Biology
- ◆ Research Grant & Fellowship Committee member, Kidney Research UK
- ◆ Chief Editor, *Frontiers in Physiology* (Renal & Epithelial Section)
- ◆ Specialty Editor (Renal), *Experimental Physiology*
- ◆ Associate Editor, *The American Journal of Physiology*

Research Interests

- ◆ Salt, hypertension and renal disease
- ◆ Interaction between renal vascular dysfunction and inflammation
- ◆ Purinergic signalling and P2X7 receptors in diabetic and non-diabetic renal disease

Techniques

- ◆ *In vivo* physiology
- ◆ Cell electrophysiology
- ◆ Gene and protein analysis
- ◆ Mass spectrometry imaging
- ◆ Renal haemodynamic analysis
- ◆ Magnetic Resonance Imaging

Key publications

- ◆ Evans LC, Ivy JR, Wyrwoll C, McNairn JA, Menzies RI, Christensen TH, Al-Dujaili EAS, Kenyon CJ, Mullins JJ, Seckl JR, Holmes MC, **Bailey MA**. Conditional deletion of *hsd11b2* in the brain causes salt appetite and hypertension. *Circulation* 133: 1360-1370 2016
- ◆ Ivy, JR, Oosthuyzen, W, Peltz, T, Howarth, AR, Hunter RW, Dhaun N Al-Dujaili, EAS, Webb, DJ, Dear, JW, Flatman, PW & **Bailey, MA**. Glucocorticoids induce non-dipping blood pressure by activating the thiazide-sensitive co-transporter. *Hypertension* 67: 1029-1037, 2016
- ◆ Menzies, RI, Howarth AR, Tam FWK, Unwin RJ, Mullins JJ & **Bailey MA**. P2X7 receptor antagonism improves renal blood flow and oxygenation in angiotensin II infused rats. *Kidney International* 88:1079-87, 2015

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Dr Phil Coan

Research Fellow



Biography

- ◆ BSc (Hons) (Leeds) Biochemistry with Medical Biochemistry (with Industrial Year)
- ◆ PhD (Cantab) Genomic Imprinting and Placental Development in the Mouse
- ◆ 11 years experience in biochemistry, in vivo physiology, and molecular biology

Research Interests

- ◆ Novel gene target identification by genetic trait linkage, quantitative trait and in silico analysis in spontaneous disease models
- ◆ Mechanistic study using *in vivo*, *ex vivo* and *in vitro* modelling, with translational follow up
- ◆ Mechanisms of heart valve disease

Techniques

- ◆ Transgenic modeling of cardiovascular disease and metabolic syndrome
- ◆ Whole animal cardiovascular and metabolic physiology
- ◆ *Ex vivo* analysis of heart valve cells and adipocytes.
- ◆ Complex trait genetics

Key publications

- ◆ **Coan PM**, Barrier M, Alfazema N, Carter RN, Marion de Procé S, Dopico XC, Garcia Diaz A, Thomson A, Jackson-Jones LH, Moyon B, Webster Z, Ross D, Moss J, Arends MJ, Morton NM, Aitman TJ. Complement factor b is a determinant of both metabolic and cardiovascular features of metabolic syndrome. *Hypertension* September 2017; 70:624-633.
- ◆ **Coan PM**, Hummel O, Garcia Diaz A, Barrier M, Alfazema N, Norsworthy PJ, Pravenec M, Petretto E, Hübner N, Aitman TJ. Genetic, physiological and comparative genomic studies of hypertension and insulin resistance in the spontaneously hypertensive rat. *Dis Model Mech* 2017; 10:297-306.
- ◆ Garcia Diaz AI, Moyon B, **Coan PM**, Alfazema N, Venda L, Woollard K, Aitman T. New wistar wyoto and spontaneously hypertensive rat transgenic models with ubiquitous expression of green fluorescent protein. *Dis Model Mech* 2016; 9:463-71.

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Dr James Dear

Reader in Clinical Pharmacology



Biography

- ◆ Experience of biomarker discovery and validation in acute organ injury and toxicology in UK and USA (National Institutes of Health (NIH))
- ◆ First to identify microRNA liver toxicity biomarker in humans
- ◆ Chief investigator on Phase 1 clinical trials

Research Interests

- ◆ Development of circulating microRNA as biomarkers of toxicology
- ◆ Clinical trials of new therapeutics for acute medical emergencies
- ◆ Development of novel biomarker point of care platforms
- ◆ Exosome biology

Techniques

- ◆ Biomarker quantification at RNA and protein level
- ◆ Exosome isolation and analysis
- ◆ Clinical biomarker studies and early phase trials

Key publications

- ◆ Vliegenthart, B, Kimmitt, RA, Seymour, JH, Homer, N, Clarke, JI, Eddleston, M, Gray, A, Wood, DM, Dargan, PI, Cooper, JG, Antoine, DJ, Webb, D, Lewis, SC, Bateman, DN & **Dear, J** 2016, 'Circulating acetaminophen metabolites are toxicokinetic biomarkers of acute liver injury' *Clinical pharmacology and therapeutics*. 10.1002/cpt.541
- ◆ Oosthuyzen, W, Scullion, KM, Ivy, J, Morrison, E, Hunter, RW, Starkey Lewis, PJ, O'Duibhir, E, Street, JM, Caporali, A, Gregory, C, Forbes, S, Webb, D, Bailey, M & **Dear, J** 2016, 'Vasopressin regulates extracellular vesicle uptake by kidney collecting duct cells' *Journal of the American Society of Nephrology*. 10.1681/ASN.2015050568
- ◆ Bateman, DN, **Dear, JW**, Thanacoody, HKR, Thomas, SHL, Eddleston, M, Sandilands, EA, Coyle, J, Cooper, JG, Rodriguez, A, Butcher, I, Lewis, SC, Vliegenthart, ADB, Veiraiyah, A, Webb, DJ & Gray, A 2014, 'Reduction of adverse effects from intravenous acetylcysteine treatment for paracetamol poisoning: a randomised controlled trial: a randomised controlled trial' *The Lancet*, vol 383, no. 9918, pp. 697-704. 10.1016/S0140-6736(13)62062-0
- ◆ Antoine, DJ, **Dear, J**, Starkey Lewis, P, Platt, V, Coyle, J, Masson, M, Thanacoody, RH, Gray, AJ, Webb, DJ, Moggs, JG, Bateman, DN, Goldring, CE & Park, BK 2013, 'Mechanistic biomarkers provide early and sensitive detection of acetaminophen-induced acute liver injury at first presentation to hospital' *Hepatology*, vol 58, no. 2, pp. 777-787. 10.1002/hep.26294

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Dr Laura Denby BSc, PhD.

ESAT Fellow / Kidney Research UK Fellow



Biography

- ◆ 10+ years experience in the field of renal disease with particularly expertise in renal pathophysiology, non-coding RNA's role in renal disease, renal-targeted gene therapy vectors and significant experience in preclinical models of renal dysfunction.
- ◆ Successful Personal Fellowship funding career track (Kidney Research UK Fellow, Edinburgh Scientific Academic Track [ESAT])
- ◆ Track record of high impact publications (Cell, Blood, J Am Soc Nephrol, Journal of Experimental Medicine, Hypertension)
- ◆ Reviewer for top tier journals (J Am Soc Nephrol, Circulation, Hypertension, Kidney International, etc) and funding bodies (MRC, Kidney Research UK)

Research Interests

- ◆ Mechanisms underpinning fibrosis and its potential resolution within the kidney
- ◆ New non-coding RNA/target identification and mechanistic modelling in *in vivo* animal models with translational follow up
- ◆ Use of non-coding RNA as biomarkers of disease in specific patient cohorts

Techniques

- ◆ Refined preclinical models of renal disease including models with renal and cardiac functional readouts and reversal of fibrosis within the kidney
- ◆ Transcriptomic analysis at the whole, single population and single cell level in normal and fibrotic kidney
- ◆ Cell signalling and mechanistic examination of non-coding RNA and their target pathways using *in vitro* and *in vivo* models

Key publications

- ◆ **Denby L**, Ramdas V, Lu R, Conway BR, Grant JS, Dickinson B, Aurora AB, McClure J, Kipgen D, Delles C, Rooij E and Baker AH. 2014. MiRNA-214 antagonism leads to protection from renal fibrosis. *J Am Soc Nephrol*, 25:65-80.
- ◆ **Denby L**, Ramdas V, McBride MW, Wang J, Robinson H, McClure J, Crawford W, Lu R, Hillyard DZ, Khanin R, Agami R, Dominiczak AF, Sharpe CC, Baker AH. 2011. MiR-21 and MiR-214 Are Consistently Modulated during Renal Injury in Rodent Models. *Am J Pathol*. 179:661-672.
- ◆ Sodi R., Eastwood J., Caslake M., Packard C.J., **Denby L**. 2017. Relationship between circulating microRNA-30c with total- and LDL-cholesterol, their circulatory transportation and effect of statins. *Clinica Chimica Acta*. 466:13-19
- ◆ Stevens K.K., **Denby L**., Patel R.K., Mark P.B., Kettlewell S., Smith G.L., Clancy M.J., Delles C., Jardine A.G. 2017. Deleterious effects of phosphate on vascular and endothelial function via disruption to the nitric oxide pathway. *Nephrol Dial Transplant*. 32:1617-162.

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Dr Neeraj Dhaun (Bean)

Senior Lecturer in Nephrology & Honorary Consultant Nephrologist,



Biography

- ◆ Fellow of the Royal College of Physicians (FRCP)
- ◆ Fellow of the American Heart Association (FAHA)
- ◆ Fellow of the American Society of Nephrology (FASN)
- ◆ Fellow of the British Pharmacological Society (FBPhS)
- ◆ Career total of >£3M of research funding
- ◆ *h*-index of 25

Research Interests

- ◆ The role of innate immunity in hypertension & vascular dysfunction
- ◆ The transition from acute kidney injury (AKI) through to chronic kidney disease
- ◆ Chorioretinal thinning in chronic kidney disease
- ◆ The role of microRNAs in small vessel vasculitis
- ◆ Assessment & treatment of cardiovascular disease in patients with chronic kidney disease

Techniques

- ◆ Invasive assessment of endothelial function using forearm plethysmography
- ◆ Pulse wave velocity as an assessment of arterial stiffness
- ◆ Retinal optical coherence tomography
- ◆ Systemic/renal haemodynamic studies including inulin/PAH assessment of GFR /renal blood flow
- ◆ Full range of molecular biology techniques:
- ◆ Macrophage depletion using diphtheria toxin and clodronate

Key publications

- ◆ Miller-Hodges E, Anand A, Shah ASV, Chapman AR, Gallacher P, Lee KK, Farrah T, Halbesma N, Blackmur JP, Newby DE, Mills NL, **Dhaun N**. High-sensitivity cardiac troponin and the risk stratification of patients with renal impairment presenting with suspected acute coronary syndrome. *Circulation*, 2018;137:425-35
- ◆ Hunter RW, Moorhouse R, MacIntyre IM, Asai T, Gallacher PJ, Kerr D, Melville V, Czopek A, Morrison EE, Dear JW, Goddard J, Webb DJ, **Dhaun N**. First in man demonstration of direct endothelin-mediated natriuresis & diuresis. *Hypertension*, 2017;70:192-200
- ◆ Balmforth C, Ruijs T, van Bragt J, Cameron JR, Kimmitt R, Czopek A, Khei MH, Borooah S, Willox L, Talwar, D, Chandran S, Dhillon B, Webb DJ, **Dhaun N**. Optical coherence tomography in chronic kidney disease: vasculopathy in the eye linked to kidney injury, inflammation & endothelial dysfunction. *JCI Insight*, 2016;1:e89173
- ◆ **Dhaun N**, Melville V, Blackwell S, Talwar DK, Johnston NR, Goddard J, Webb DJ. Endothelin-A receptor antagonism modifies novel cardiovascular risk factors in chronic kidney disease: a randomized controlled trial. *J Am Soc Nephrol*, 2013;24:31-6

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Professor Michael Eddleston

Chair of Clinical Toxicology



Biography

- ◆ 23 years' experience of academic clinical and public health intervention trials in South Asia, identifying effective antidotes & public health approaches to preventing deaths from poisoning
- ◆ >£20 million funding raised for clinical and public health research
- ◆ Six trials completed and published, nine Lancet publications
- ◆ Established the Wellcome Trust Critical Care Laboratory for Large Animals (CCLLA), a national resource in Edinburgh for translational research
- ◆ Multiple national and international prizes, including the Inaugural IUTOX Triennial Early Toxicologist Award (2007), a Lister Research Prize Fellowship (2011), and the Cullen Medal for the greatest benefit to the practice of medicine, Royal College of Physicians of Edinburgh (2017)
- ◆ Clinical pharmacologist on the Scottish Medicines Commission

Research Interests

- ◆ Identification of effective antidotes for poisoned patients
- ◆ Organophosphorus insecticide poisoning
- ◆ Phase II/III clinical trials and very large cluster RCTs for public health interventions
- ◆ Safety and design of First into Human studies

Key publications

- ◆ Pearson M, Metcalfe C, Jayamanne S, Gunnell D, Weerasinghe M, Pieris P, Priyadarshana C, Knipe DW, Hawton K, Dawson AH, Bandara P, DeSilva D, Gawarammana I, **Eddleston M**,* Konradsen F. Effectiveness of household lockable pesticide storage to reduce pesticide self-poisoning in rural Asia: a community-based cluster randomised controlled trial. *Lancet* 2017, 390: 1863-72. (* corresponding author)
- ◆ **Eddleston M**, Eyer P, Worek F, Juzsaczak E, Alder N, et al. Pralidoxime in acute organophosphorus insecticide poisoning - a randomised controlled trial. *PLoS Medicine* 2009, 6: e1000104.
- ◆ **Eddleston M**, Buckley NA, Senarathna L, Mohammed F, Dissanayake W, et al, for the Ox-Col Poisoning Study collaborators. Multiple dose activated charcoal in acute self-poisoning - a randomised controlled trial. *Lancet* 2008, 371: 579-586.
- ◆ **Eddleston M**, Eyer P, Worek F, Mohamed F, Senarathna L, et al. Differences between organophosphorus insecticides in human self-poisoning - a prospective cohort study. *Lancet* 2005, 366: 1452-59.
- ◆ **Eddleston M**, Rajapakse S, Rajakanthan K, Jayalath S, Sjoström L, et al. Anti-digoxin Fab fragments in cardiotoxicity induced by ingestion of yellow oleander: a randomised controlled trial. *Lancet* 2000, 355:967-972.

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Dr Robert Hunter

Wellcome Trust Clinical Research Career Development Fellow



Biography

- ◆ Honorary Consultant Nephrologist
- ◆ PhD and post-doctoral research focus on renal function *in vitro* and *in vivo*
- ◆ Some experience of phase 1 clinical trials

Research Interests

- ◆ Kidney function in health & disease
- ◆ Cardiovascular disease
- ◆ Extracellular RNA signalling
- ◆ Extracellular vesicle signalling

Techniques

- ◆ *in vitro* disease modelling in kidney cells
- ◆ Extracellular vesicle analysis
- ◆ RNA labelling
- ◆ *in vivo* renal clearance

Key publications

- ◆ **Hunter RW**, Moorhouse R, Farrah TE et al. First-in-Man Demonstration of Direct Endothelin-Mediated Natriuresis and Diuresis. *Hypertension* (Dallas, Tex.: 1979) 2017;
- ◆ Oosthuyzen W, Scullion KM, Ivy JR et al. Vasopressin Regulates Extracellular Vesicle Uptake by Kidney Collecting Duct Cells. *Journal of the American Society of Nephrology: JASN* 2016;
- ◆ **Hunter RW**, Ivy JR, Flatman PW et al. Hypertrophy in the Distal Convoluted Tubule of an 11 β -Hydroxysteroid Dehydrogenase Type 2 Knockout Model. *Journal of the American Society of Nephrology: JASN* 2015; 26: 1537–1548.

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Dr Robert I Menzies

British Heart Foundation Fellow



Biography

- ◆ 7yrs hands-on experience (4yrs post-PhD) developing cardiovascular and renal disease models
- ◆ Multidisciplinary background in physics and biology
- ◆ Raised >£470k in past 4 years over 5 grants for preclinical research projects
- ◆ Previous experience working under preclinical pharmacology contract for AstraZeneca

Research Interests

- ◆ Vascular function and remodelling in hypertensive and/or diabetic kidney disease
- ◆ Identification of novel therapeutic targets and their translation into drug discovery
- ◆ Discovery of new applications for established compounds

Techniques

- ◆ Myographic investigation of arterial function *ex vivo*
- ◆ Surgical preparations for preclinical pharmacological investigations
- ◆ Handling, analysis and visualisation of large datasets (publications include fMRI and radiotelemetric blood pressure analysis)
- ◆ Optimisation of a wide array of molecular biology assays at gene and protein levels

Key publications

- ◆ **Menzies RI**, Booth JWR, Bailey MA, Tam FWK, Norman JT & Unwin RJ. P2X7R activation during beta cell injury and diabetic nephropathy. *EBioMedicine* 19: 73-83, 2017
- ◆ Evans LC, Ivy JR, Wyrwoll C, McNairn JA, **Menzies RI**, Christensen TH, Al-Dujaili E, Kenyon CJ, Mullins JJ, Seckl JR, Holmes MC & Bailey MA. Conditional deletion of hsd11b2 in the brain causes salt appetite and hypertension. *Circulation* 133: 1360-1370, 2016
- ◆ **Menzies RI**, Howarth AR, Mullins JJ, Tam FWK, Unwin RJ & Bailey MA. Inhibition of the purinergic P2X7 receptor improves renal perfusion in angiotensin-II infused rats. *Kidney International* 88: 1079-1087, 2015
- ◆ **Menzies RI**, Zammit-Mangion A, Hollis LM, Lennen RJ, Jansen MA, Webb DJ, Mullins JJ, Dear JW, Sanguinetti G & Bailey MA. An anatomically-unbiased approach for analysis of renal BOLD magnetic resonance images. *Am. J. Physiol. Renal Physiology* 305: F485-F852, 2013

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Professor John Mullins

Chair of Molecular Physiology



Biography

After training in the UK, USA and Germany, I joined the University of Edinburgh in 1990 was awarded a Wellcome Trust Principal Research Fellowship in 1998 and Personal Chair in 1999. In 2001 I was appointed director of the Wellcome Trust Cardiovascular Research Initiative (01-09) and in 2004 became Head of the Centre for Cardiovascular Science (04-09). I currently direct the BHF Centre of Research Excellence having led the initial bid in 2008 and the renewal in 2014. I established and directed both the Wellcome Trust 4-year PhD programme in cardiovascular science and led the bid and directed the first BHF 4-year PhD programme at the UoE. I have held multiple programme grants, infrastructure and strategic awards and have contributed to the profile of the UoE Edinburgh as a leading centre of integrative physiology, bringing together researchers in disciplines such as molecular biology, physiology and biochemistry. Interdisciplinary contributions include the development of the first specialist rodent pathology unit in the UK, and the integration of the physical sciences including physics, chemistry engineering into research within the Centre.

Research Interests

- ◆ Molecular physiology of blood pressure regulation in the kidney
- ◆ Application of interdisciplinary science to cardiovascular biology
- ◆ Cell plasticity in physiology and pathophysiology
- ◆ Developmental biology of specialised renal cells: JG cells, pericytes, podocytes and collecting duct cells

Techniques

- ◆ Transgenesis and genetic modification
- ◆ Zebrafish models for renal development, cell biology and optogenetics
- ◆ 3D Scaffolds and microfluidics for cell culture
- ◆ Molecular physiology of renin-angiotensin-aldosterone system (renal/adrenal and HPA axis)

Selected Publications (total >200)

- ◆ Assmus AM, Mansley MK, Mullins LJ, Peter A and **Mullins JJ**. mCCDc1 cells show Plasticity Consistent with the Ability to Transition between Principal and Intercalated Cells. *Am J Physiol Renal Physiol*. 2018 May 1;314(5):F820-F831
- ◆ Hunter RW, Ivy JR, Flatman PW, Kenyon CJ, Craigie E, Mullins LJ, Bailey MA, **Mullins JJ**. Hypertrophy in the distal convoluted tubule of an 11 β -hydroxysteroid dehydrogenase type 2 knockout model. *J Am Soc Nephrol* 2014 Oct.
- ◆ Bailey MA, Paterson JM, Hadoke PWF, Wrobel N, Bellamy COC, Brownstein DG, Seckl JR, **Mullins JJ**. A switch in the mechanism of hypertension in the syndrome of apparent mineralocorticoid excess. *J Am Soc Neph* 19 47-58 2008.
- ◆ Kotelevtsev Y, Brown RW, Fleming S, Kenyon C, Edwards CR, Seckl JR, **Mullins JJ**. Hypertension in mice lacking 11beta-hydroxysteroid dehydrogenase type 2. *J Clin Invest*. 1999 Mar;103(5):683-9.
- ◆ **Mullins JJ**, Peters J, Ganten D. Fulminant hypertension in transgenic rats harbouring the mouse Ren-2 gene. *Nature*. 1990 Apr 5;344(6266):541-4.

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Professor David J Webb

Christison Chair of Therapeutics and Clinical Pharmacology



Biography

- ◆ 30 years' experience in drug development in academia and with industry
- ◆ Director of Edinburgh University's Clinical Research Centre
- ◆ First Director of Edinburgh University's Centre for Cardiovascular Science
- ◆ Head of Edinburgh Hypertension Excellence Centre (ESH-accredited)
- ◆ Theme Lead, Hypertension & Kidney Disease, Centre for Cardiovascular Science
- ◆ Involved in the development of renin inhibitors, endothelin antagonists and PDE5 inhibitors

Research Interests

- ◆ Mechanisms and treatment of hypertension (esp. treatment-resistant & chronic kidney disease)
- ◆ Structure and function of blood vessels; arterial stiffness and endothelial dysfunction
- ◆ Drug regulation – member of the Medicines and Healthcare Products Regulatory Agency (MHRA) Board; Chair of the Scientific Advisory Committee
- ◆ Health Technology Assessment – past Chair, Scottish Medicines Consortium (Scotland's NICE)

Techniques

- ◆ First-in-human and early phase studies, including proof-of-principle
- ◆ Cardiovascular investigations of arterial, venous and renal function
- ◆ Retinal optical coherence tomography
- ◆ Phase 3 registration studies in cardiovascular disease

Key publications

- ◆ Haynes WG, **Webb DJ**. Contribution of endogenous generation of ET-1 to basal vascular tone. *Lancet* 1994;344:852-4.
- ◆ **Webb DJ**, et al. Sildenafil citrate potentiates the hypotensive effects of nitric oxide donor drugs in male patients with stable angina. *J Am Coll Cardiol* 2000; ;36:25-31.
- ◆ Goddard J, Johnston NR, Hand MF, Cumming AD, Rabelink TJ, Rankin AJ, **Webb DJ**. Endothelin-A receptor antagonism reduces blood pressure and increases renal blood flow in hypertensive patients with chronic renal failure. *Circulation* 2004;109:1186-93.
- ◆ MacIntyre IM, Dhaun N, Lilitkarntakul P, Melville V, Goddard J, **Webb DJ**. Greater functional ETB receptor antagonism with bosentan than sitaxsentan in healthy men. *Hypertension* 2010;55:1406-11
- ◆ Williams B, MacDonald TM, Morant S, **Webb DJ**, et al. for the British Hypertension Society's PATHWAY Studies Group. Spironolactone versus placebo, bisoprolol, and doxazosin to determine the optimal treatment for drug-resistant hypertension (PATHWAY-2): a randomised, double-blind, crossover trial. *Lancet* 2015;386:2059-68.

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Cardiometabolic Imaging

Professor Megan Holmes

Chair of Molecular Neuroendocrinology



Biography

- ◆ >35 years research experience in glucocorticoid regulation and action
- ◆ Expertise in the Regulation of the Hypothalamo-Pituitary Adrenal axis and consequences on the brain and body. Early-life stress programming of adult disease, particularly mental health.
- ◆ Attracted >£14M in fellowships and research grants
- ◆ Published >100 research papers, H-index 42
- ◆ Director of Edinburgh Preclinical Imaging
- ◆ Member of assessment panels for Cross council call on Mental Health, International DFG collaborative centre, Canadian Research council and reviewer of MRC/BBSRC grant applications. Senior editor Journal Neuroendocrinology

Research Interests

- ◆ Developmental consequences of early-life exposure of glucocorticoids on foeto-placental growth and function
- ◆ Long term effects of stress and glucocorticoids on mental health and cognition
- ◆ Investigating the role of the brain in regulation of salt appetite and hypertension
- ◆ Developing *in vivo* imaging techniques for blood flow and heart development (high definition ultrasound) in utero and functional MRI protocols in awake rodents to determine the functional consequences of stress and glucocorticoid exposure

Techniques

- ◆ Animal models with altered glucocorticoid signalling
- ◆ Whole animal physiology to address the consequences of glucocorticoid exposure
- ◆ Cell signalling and high throughput gene expression profiling
- ◆ *In vivo* imaging of structure and function in animal models (MRI and ultrasound)

Key publications

- ◆ Wyrwoll CS, Noble J, Thomson A, Tesic D, Miller MR, Rog-Zielinska EA, Moran CM, Seckl JR, Chapman KE, **Holmes MC**. 2016. Pravastatin ameliorates placental vascular defects, fetal growth, and cardiac function in a model of glucocorticoid excess. *Proc Natl Acad Sci USA* 113: 6265-6270
- ◆ Evans LC, Ivy JR, Wyrwoll C, McNairn JA, Menzies RI, Christensen TH, Al-Dujaili EA, Kenyon CJ, Mullins JJ, Seckl JR, **Holmes MC**, Bailey MA. 2016 Conditional deletion of Hsd11b2 in the brain causes salt appetite and hypertension. 2016. *Circulation* 133: 1360-1370
- ◆ Wyrwoll CS, Keith M, Noble J, Stevenson PL, Bombail V, Crombie S, Evans LC, Bailey MA, Wood E, Seckl JR, **Holmes MC**. 2015. Fetal brain 11 β -hydroxysteroid dehydrogenase type 2 selectively determines programming of adult depressive-like behaviors and cognitive function, but not anxiety behaviors in male mice. *Psychoneuroendocrinology* 59, 59-70
- ◆ Harris AP, Lennen RJ, Brydges NM, Jansen MA, Pernet CR, Whalley HC, Marshall I, Baker S, Basso AM, Day M, **Holmes MC***, Hall J*. 2016. The role of Brain Derived Neurotrophic Factor in learned fear processing: an awake rat fMRI study. *Genes Brain Behav.* 15(2):221-30. [Epub ahead of print Jan 2016] *Joint senior authors

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Prof Peter Hoskins

Professor of Medical Physics and Biomechanics

Biography



- ◆ 34 years' experience of design of new and improved diagnostic techniques for measurement of blood flow and related quantities in arteries using Doppler ultrasound with applications in arterial disease.
- ◆ 30 years' experience of design, construction and use of experimental flow systems ('phantoms') for validation of measurements of blood flow and related quantities using Doppler ultrasound with applications in arterial disease.
- ◆ 15 years' experience of development and use of synthetic flow phantoms for validation of measurements of blood flow and related quantities using Doppler ultrasound with applications in arterial disease.
- ◆ 15 years' experience of development of patient specific modelling (integration of 3D imaging and modelling) with applications in arterial disease.
- ◆ 5 years' experience of development and modelling of magnetic resonance elastography with applications in arterial disease.
- ◆ 3 years' experience of collaboration (with Timm Kruger) in modelling flow in small vessels with applications in mouse haemodynamics, atherosclerosis and cancer.

Research Interests

- ◆ All below relevant to cardiovascular diseases:
 - Clinical vascular ultrasound technology and applications
 - Patient specific modelling in arteries
 - Modelling flow in small vessels

Key publications

- ◆ Hardman D, Semple SIK, Richards JM, **Hoskins PR**. Comparison of patient specific inlet boundary conditions in the numerical modelling of blood flow in abdominal aortic aneurysm disease. *International Journal of Numerical Methods in Biomedical Engineering* 2013;29:165-178.
- ◆ Kenwright DA, Thomson A; Anderson T; Moran CM; Hadoke PW; Gray GA; **Hoskins PR**. A protocol for improved measurement of arterial flow rate in preclinical ultrasound. *Ultrasound International Open* 2015;November DOI: 10.1055/s-0035-1564268
- ◆ Thomas -Seale L, Klatt D, Sack I, Roberts N, Pankaj P, **Hoskins PR**. The simulation of magnetic resonance elastography through atherosclerosis. *Journal of Biomechanics* 2016;49:1781-1788.
- ◆ Zhou X, Zia C, Gandy S, Khan F, Corner G, **Hoskins PR**, Huang Z,. Investigation of ultrasound-measured flow velocity, flow rate and wall shear rate in radial and ulnar arteries using simulation. *Ultrasound in Medicine and Biology* 2017;43:981-992.
- ◆ Conlisk N, Mc Bride O, Forsythe T, Richards JM, Doyle BJ, Gray CD, Semple SIK, MacGillivray T, Newby DE, **Hoskins PR**. Exploring the biological and mechanical properties of abdominal aortic aneurysms using USPIO MRI and peak tissue stress: A combined clinical and finite element study. *J Cardiovasc Translational Research* 2017;10:4890498.

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Dr Maurits Jansen

Manager Edinburgh Preclinical Imaging



Biography

- ◆ 20 years' experience in the field of preclinical Magnetic Resonance Imaging and Spectroscopy
- ◆ I established a preclinical mouse MRI facility in Utrecht, the Netherlands and the preclinical MRI facility in Edinburgh. I manage the Edinburgh Preclinical Imaging facilities, a state-of-the-art facility housing 4 imaging modalities: high-field MRI, ultrasound, optical imaging and micro PET/CT imaging.
- ◆ Principal and co-investigator on various preclinical research projects resulting in high impact publications (Circulation, Plos Medicine, Mol. Psychiatry, Am. J. Respir. Crit. Care Med.)
- ◆ Reviewer for various scientific journals (e.g. Circulation, NMR in Biomedicine, Journal of Cardiovascular Magnetic Resonance, American Journal of Physiology, BMC Medical Imaging, Journal of the Neurological Sciences) and funding bodies (MRC)

Research Interests

- ◆ Animal models of Cardiovascular disease
- ◆ Development and implementation of MRI and MRS methods
- ◆ Development of imaging biomarkers

Techniques

- ◆ Magnetic Resonance Imaging and Spectroscopy
- ◆ Positron Emission Tomography and Computed Tomography
- ◆ Various animal models of disease (e.g. coronary artery ligation for induction of myocardial ischaemia and infarction in mice and rats)
- ◆ Langendorff perfusion of mouse and rat heart

Key publications

- ◆ White CI, **Jansen MA**, McGregor K, Thomson A, Richardson RV, Mylonas KJ, Moran CM, Seckl JR, Walker BR, Chapman KE, Gray GA. Cardiomyocyte and vascular smooth muscle independent 11 β -hydroxysteroid dehydrogenase 1 amplifies infarct expansion, hypertrophy and the development of heart failure following myocardial infarction in male mice. *Endocrinology*. 2016 Jan; 157(1): 346-57.
- ◆ Girardi G, Fraser J, Lennen R, Vontell R, **Jansen MA** and Hutchison G. Imaging of activated complement using ultrasmall superparamagnetic iron oxide (USPIO) particles to predict pregnancy and fetal outcomes. *Mol Psychiatr* 2015;(20):1017-1026
- ◆ Gray GA, White CI, Thomson A, Marshall I, Kozak AM, Moran CM, **Jansen MA**. Imaging the healing myocardial infarct-ultrasound, MRI and near-infrared fluorescence. *Exp Physiol*. 2013; 98(3): 606-13.

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Dr Carmel Moran

Reader in Medical Physics



Biography

- ◆ 30 years' experience in ultrasound research
- ◆ Past President of British Medical Ultrasound Society
- ◆ Member of the Safety Committee of the European Federation of Ultrasound in Medicine and Biology

Research Interests

- ◆ Physics of ultrasound imaging
- ◆ Preclinical ultrasound imaging
- ◆ Development and characterisation of targeted ultrasound contrast microbubbles.
- ◆ Acoustic characterisation of tissues at high frequencies
- ◆ Development of quality assurance test objects for high frequency ultrasound scanners

Techniques

- ◆ Acoustic characterisation of soft tissues and contrast agents
- ◆ Manufacture of tissue mimicking materials
- ◆ Test object development

Key publications

- ◆ Rabell-Montiel A, Thomson A, Pye SD, Anderson TA, **Moran CM**. The acoustic properties of small animal soft tissue in the frequency range 12-32MHz. *Ultrasound in Medicine and Biology* 2018; 44:702-713.
- ◆ Rabell-Montiel A, Browne JE, Pye SD, Anderson TA, **Moran CM**. A modified technique for the broadband acoustic characterisation of agar-based tissue mimicking material - a longitudinal study. *Ultrasound in Medicine and Biology* 2017;43:1494-1505.
- ◆ **Moran CM**, Thomson A, Rog-Zielinska EA, Gray G. High resolution echocardiography in the assessment of cardiac physiology and disease in preclinical models. *Experimental Physiology* 2013;98 (3):629-644.
- ◆ **Moran CM**, Pye SD, Ellis B, Janeczko A, Morris KD, McNeilly AS, Fraser HM. A comparison of the imaging performance of high resolution ultrasound scanners for preclinical imaging. *Ultrasound Med Biol* 2011;37:493-501.

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Dr Adriana Tavares

Research Fellow PET Imaging & Head of Preclinical PET/CT Laboratory



Biography

- ◆ 7 years' experience in radiotracer and drug discovery and development in industry and academia – established radiotracer discovery activities at College of Medicine and Veterinary Medicine
- ◆ >£2.2 million funding raised for PET research
- ◆ Broad experience across disciplines and therapeutic areas
- ◆ Track record of success: radiotracers translated to clinical use include 123I-MNI420 and 18F-MNI444 for imaging adenosine-2A receptors, and 18F-MNI659 for imaging phosphodiesterase-10. Drugs in clinical use include: preladenant and tozadenant for treatment of Parkinson's disease, fingolimod for treatment of Multiple Sclerosis. Worked with over 40 different pharmaceutical/imaging companies to date (including, GSK, UCB, Novartis, Abbott, Sanofi, Eli Lilly, Merck, Johnson&Johnson, and Biogen). Currently working on first fluorinated PET radiotracer for imaging TSPO with binding independent of rs6971 genetic polymorphism (translation to humans by 2020)

Research Interests

- ◆ Discovery and development of new radiotracers
- ◆ Repurpose of previously developed radiotracers/drugs for new applications
- ◆ Development of novel *in vitro* screening techniques
- ◆ Investigate and develop new PET/SPECT quantification methods

Techniques

- ◆ *In vitro* screening – cell and tissue radioligand binding assays; and HPLC-based screening methods
- ◆ *In vivo* PET, SPECT and CT imaging (rodents, nonhuman primates and humans)
- ◆ Kinetic modelling of PET, SPECT and CT data
- ◆ Dosimetry analysis for radionuclide imaging (including OLINDA estimates)
- ◆ Metabolite analysis by HPLC (including radiometabolite studies)
- ◆ PK/PD studies
- ◆ Autoradiography

Key publications

- ◆ MacAskill MG, Zmuda F, Blair A, Lucatelli C, Dweck MR, Gray GA, Newby DE, Sutherland A, Pimlott SL, **Tavares AAS** (2017). Binding affinity profiles of isoquinoline carboxamide and phenoxyphenyl acetamide-based TSPO PET ligands in human brain and heart. *J Nuc Med.* 58 (S1):478.
- ◆ McDougald WA, Collins R, Green M, **Tavares AAS** (2017). "High dose microCT does not contribute towards improved microPET/CT image quantitative accuracy and can limit longitudinal scanning of small animals". *Frontiers in Physics.* 5:50.
- ◆ MacAskill MG, **Tavares AS**, Wu J, Lucatelli C, Mountford JC, Baker AH, Newby DE, Hadoke PWF (2017). PET Cell Tracking Using 18F-FLT is Not Limited by Local Reuptake of Free Radiotracer. *Nat Sci Rep.* 7: 44233.
- ◆ **Tavares AAS**, Caillé F, Barret O, Papin C, Lee H, Morley T, Fowles K, Holden D, Seibyl JP, Alagille D, Tamagnan GD (2014). *In vivo* evaluation of 18F-MNI-698: A novel 18F-labeled radiotracer for imaging of serotonin 4 receptors in brain. *J Nuc Med.* 55: 858-64.
- ◆ **Tavares AAS**, Batis JC, Papin C, Jennings D, Alagille D, Russell DS, Vala C, Lee H, Baldwin RM, Zubal IG, Marek KL, Seibyl JP, Barret O and Tamagnan GD (2013). Kinetic modeling, test-retest and dosimetry of [123I]MNI-420 in humans. *J Nuc Med.* 54:1760-1767.

