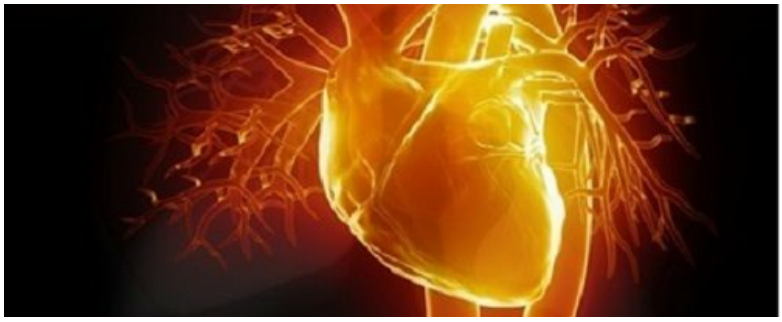
Cardiovascular Translational Group: Myocardial Infarction and Heart Failure



Group leader: **Dr Melanie Madhani (/staff/profiles/cem/CVRS/Madhani-Melanie.aspx)**

Overview

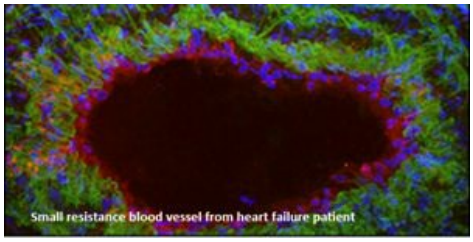
The main aim of our research is to characterise the functional deterioration within the heart and vasculature following myocardial infarction and heart failure and to assess pharmacological methods of improving outcomes.

Our research group

Despite advances in both knowledge and technology, coronary heart disease is the most common cause of death worldwide. Currently, substantial expenditure in the health service is directed towards restoring blood flow in patients with acute myocardial infarction (AMI) in order to limit myocardial injury. Whilst this has substantially reduced mortality, nevertheless the associated myocardial injury frequently leads to the development of heart failure that may develop either soon or after the index event. Our research group is interested to understand the mechanisms of myocardial injury during ischaemia and reperfusion and how this affects vascular functions. Of particular interest is to understand the physiological and pathological actions of nitrite. Currently, we have a broad range of translational research taking place in our group to investigate the role of nitrite therapy from "bench to bedside":

Basic and Clinical Translational Research:

- Investigation of novel cardioprotective strategies and the role of nitrite in cardioprotection from bench to bedside (patients undergoing coronary artery bypass grafting surgery)
- Assessment of vascular dysfunction in heart failure
- Effect of cardiovascular disease on myocardial cellular signalling



Open all sections

Current Projects

- Effects of nitrite on cardiac muscle: Physiology, Pharmacology and Therapeutic Potential (Medical Research Council funded, led by Prof Frenneaux)
- Nitrites in heart failure (British Heart Foundation funded, led by Prof Frenneaux and Dr Madhani)
- Effects of glucose-insulin-potassium therapy in patients undergoing coronary artery bypass graft (CABG) surgery (University Hospitals Birmingham Charities funded, led by Dr Melanie Madhani)
- Effects of natriuretic peptides on platelet function (British Heart Foundation funded, led by Dr Melanie Madhani, Prof Adrian Hobbs and Prof Steve Watson)
- Effects of a modest reduction in renal function on cardiovascular structure and function: a study of kidney donors (BHF funded led by Dr Moody, Dr Townend, Dr Madhani and Dr Ferro)

Recent Publications

- Siddiqi N, Bruce M, Neil CJ, Jagpal B, Maclennon G, Cotton SC, Papadopoulo SA, Bunce N, Lim P, Schwarz K, Singh S, Hildick-Smith D, Horowitz JD, Madhani M, Boon N, Kaski JC, Dawson D and Frenneaux MP (2013) **Protocol: does sodium nitrite administration reduce ischaemia-reperfusion injury in patients presenting with acute ST segment elevation myocardial infarction? Nitrites in acute myocardial infarction (NIAMI) (http://www.ncbi.nlm.nih.gov/pubmed/23648219)** . *J Transl Med* 11:116. doi: 10.1186/1479-5876-11-116
- Maher AR, Arif S, Madhani M, Abozguia K, Ahmed I, Fernandez BO, Feelisch M, O'Sullivan A, Christopoulos A, Sverdlov AL, Ngo D, Dautov R, James PE, Horowitz JD and Frenneaux MP (2013) **Impact of chronic congestive heart failure on pharmacokinetics and vasomotor effects of infused nitrite. (http://www.ncbi.nlm.nih.gov/pubmed/23472879)** *Br J Pharmacol* 169(3):659-70. doi: 10.1111/bph.12152
- Borgognone A, Lowe KL, Watson SP and Madhani M (2013) **Natriuretic peptides induce weak VASP phosphorylation at Serine 239 in platelets. (http://www.ncbi.nlm.nih.gov/pubmed/23469931)** > *Platelets* [Epub ahead of print]
- Moody WE, Edwards NC, Madhani M, Chue CD, Steeds RP, Ferro CJ and Townend JN (2012) **Endothelial dysfunction and cardiovascular disease in early-stage chronic kidney disease: cause or association? (http://www.ncbi.nlm.nih.gov/pubmed/22349087)** *Atherosclerosis* 223(1):86-94. doi: 10.1016/j.atherosclerosis.2012.01.043
- Madhani M, Hall AR, Cuello F, Charles RL, Burgoyne JR, Fuller W, Hobbs AJ, Shattock MJ and Eaton P (2010) **Phospholemman Ser69 phosphorylation contributes to sildenafil-induced cardioprotection against reperfusion injury. (http://www.ncbi.nlm.nih.gov/pubmed/20543084)** *Am J Physiol Heart Circ Physiol* 299(3):H827-36. doi: 10.1152/ajpheart.00129.2010

For full publication lists see:

- **Madhani publications (http://www.ncbi.nlm.nih.gov/pubmed/?term=madhani+m+%5Bau%5D)**

Staff

Principal Investigators
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Postdoctoral Researchers
Dr Jenna Bailey - Medical Research Council Research Fellow

Dr Alessandra Borgognone - British Heart Foundation Research Fellow

Internal Collaborators
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Dr Charles Ferro - NIHR Fellow and Consultant Nephrologist, Birmingham Cardio-Renal Group
Dr John Townend - Honorary Reader in Cardiology and Consultant Cardiologist, Birmingham Cardio-Renal Group

BCRG PhD Student
Dr William Moody (http://www.birmingham.ac.uk/staff/profiles/cem/CVRS/moody-william.aspx) - British Heart Foundation Clinical Research Fellow and SpR in Cardiology

Cardiac Surgeons
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Mr Jorge Mascaro - Consultant, University Hospitals Birmingham NHS Trust, UK
Ms Ashvini Menon

External Collaborators
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Professor Adrian Hobbs (http://www.whri.qmul.ac.uk/staff-all/staff-research/117-hobbs-adrian) - Barts and The London School of Medicine and Dentistry at Queen Mary, London, UK
Professor John Horowitz (http://www.basilhetzelinstitute.com.au/about-us/personnel?person=903) - University of Adelaide, South Australia, Australia
Professor Malcolm Underwood (http://www.ctsnet.org/home/munderwood) - The Chinese University of Hong Kong, Hong Kong

Funding Bodies

British Heart Foundation (BHF) (http://www.bhf.org.uk)

Medical Research Council (MRC) (http://www.mrc.ac.uk/index.htm)

Queen Elizabeth Hospital Charity (http://qehb.org/)

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