UK Centre for Cardiovascular and Diabetes Research
TEACHING HOSPITALS SERVING THREE MILLION PEOPLE

LOCATION OF THE CLINICAL RESEARCH FACILITY
STRATEGIC IMPORTANCE

from the Dean, Professor Paul Stewart FMedSci

The Centre has a critical role to play in advancing understanding of cardiovascular disease and diabetes to improve human life.

It is an important team effort between the University of Leeds and Leeds Teaching Hospitals Trust and a major priority for our Joint Partnership Board chaired by the Vice Chancellor and Chief Executive of the Trust.
THE DISEASE PROBLEM

“Why diabetes? Because despite all the improvements we’ve made in medicine and all the innovations we’ve had in surgery, people with type 2 diabetes are three times more likely to die from a heart attack, and they don’t respond nearly as well to treatment for heart failure.”

BHF Professor Mark Kearney was the lead in the BHF’s 2013 advertising campaign ‘We hate heart disease.’

Professor Mark Kearney
British Heart Foundation Chair of Cardiovascular and Diabetes Research and Consultant Cardiologist
£14 MILLION OF NEW RESEARCH GRANTS FROM EXTERNAL FUNDERS

Grants in 1 year: June 2012 to May 2013

JOHN GREENWOOD, PROFESSOR, CONSULTANT CARDIOLOGIST, AND BHF SPECIAL PROJECT GRANT HOLDER
THE EXTERNAL FUNDING WE RECEIVE HELPS US MAKE A DIFFERENCE IN OUR FIGHT AGAINST HEART DISEASE
CARDIOVASCULAR DISEASE AND DIABETES IS A GLOBAL CHALLENGE

Diabetes is increasingly common world-wide and adversely affects many aspects of the cardiovascular system.

Predictions from the UK Biobank, a major investment to investigate disease in 500,000 UK citizens, show the numbers of people in this cohort predicted to suffer from a specified condition in 2022. Diabetes is the most common problem; myocardial infarction/coronary heart disease and stroke are the next two.
CLINICAL TRIALS

2ND NATIONALLY IN RECRUITMENT TO CARDIOVASCULAR CLINICAL TRIALS

CLINICAL TRIALS RESEARCH UNIT

NEW CLINICAL RESEARCH FACILITY

ALISTAIR HALL, PROFESSOR AND CONSULTANT CARDIOLOGIST, AND LEADER OF CARDIOVASCULAR CLINICAL TRIALS
CLINICIAN SCIENTISTS

UNDERSTANDING VASCULAR INSULIN RESISTANCE

STEPHEN WHEATCROFT, SENIOR LECTURER, ERC FELLOW, AND CONSULTANT CARDIOLOGIST
EXCELLENCE IN RESEARCH IS SUPPORTED BY CUTTING-EDGE FACILITIES

The centre promotes research of the highest standard and greatest impact on patients.
A HISTORY OF MAKING DISCOVERIES, INNOVATION AND Changing PEOPLES LIVES...
AIRE STUDY – TREATMENT OF HEART FAILURE
ENGINEERED HEART VALVE
NOVEL ANTICOAGULANTS
ACE2
REDOX CONTROL THROUGH ION CHANNELS
FOCUS ON IMAGING

We have cutting-edge preclinical and clinical cardiovascular imaging facilities and our researchers have pushed the boundaries of imaging and probe technology from single molecules to cells and whole organisms. Our clinical imaging research has informed international practice guidelines and we lead several large ongoing multi-centre imaging trials. Our work showing the superiority of MRI for diagnosing cardiovascular disease has the potential to transform the lives of patients (Lancet, 2012).
WE ENCOURAGE EFFORTS TO TRANSLATE FINDINGS INTO MORE EFFECTIVE PREVENTION AND TREATMENT OF DISEASE

RICHARD CUBBON, CLINICAL LECTURER, BHF INTERMEDIATE RESEARCH FELLOW AND CARDIOLOGIST
WE STIMULATE ENTERPRISE AND KNOWLEDGE TRANSFER TO MEET THE CARDIOVASCULAR DISEASE AND DIABETES CHALLENGE

ROBERT ARIENS, PROFESSOR, GROUP LEADER, AND BHF PROGRAMME GRANT HOLDER
Leeds is a major medical engineering centre for musculoskeletal and cardiovascular diseases. The group won the 2012 Queen’s Anniversary Prize and founded a spin-out company, Tissue Regenix Group PLC which is focussed upon the commercialisation of Leeds acellular biological scaffold technology. It achieved CE Mark for dCELLR Vascular Patch following successful clinical trials. Bespoke bioprocesses for cardiovascular tissues have been developed which remove the cells, cell remnants and functional DNA. Studies have shown that acellular biological scaffolds derived from both allogeneic and xenogeneic tissues are effective for cardiovascular applications. The group’s focus is on clinical translation of additional acellular allogeneic and xenogeneic biological scaffolds for cardiovascular applications.
Peter is Professor of Medicine, Consultant Diabetologist, and Fellow of the Academy of Medical Sciences. He is also BHF Programme Grant holder and Co-chair of the European Association for the Study of Diabetes task force to update guidelines on diabetes and cardiovascular disease. He has particular interest in mechanisms of thrombosis and translational of this new understanding into therapeutic improvements.
4-YEAR PHD PROGRAMME IN CARDIOVASCULAR DISEASE AND DIABETES
THE CENTRE HAS A UNIQUE STRUCTURE OF MULTIDISCIPLINARY PROGRAMME AND TECHNOLOGY GROUPS

CARDIOVASCULAR AND DIABETES RESEARCH IS IMPORTANT TO ALL OF THEM.

SREENIVASAN PONNAMBALAM, READER AND DEPUTY PROGRAMME GROUP LEADER
ENDOTHELIAL CELL BIOLOGY AND DIABETES

PROFESSOR MARK KEARNEY
Our laboratory, funded by a British Heart Foundation programme grant, is exploring the mechanistic link between endothelial function and insulin resistance.

DR SREENIVASAN PONNAMBALAM
Our research is focused on understanding the mechanisms underlying vascular receptor-ligand interactions leading to control or dysfunction of vascular physiology.

PROFESSOR DAVID BEECH
The aim of the lab is to make fundamental discoveries relating to trans-membrane calcium and sodium ion movements in mammalian cells, especially regarding ion channels in cells of human vascular diseases and associated conditions.

DR STEPHEN WHEATCROFT
My research focuses on the use of genetically altered murine models to investigate the effects of insulin and the IGF-binding proteins on vascular biology.

DR KAREN PORTER
My group investigates the cellular and molecular pathways that lead to increased coronary heart disease and poor outcomes after arterial bypass grafting in individuals with type 2 diabetes.

DR RICHARD CUBBON
Our research is focussed on understanding how insulin resistance and diabetes impact upon the formation and repair of blood vessels, with the aim of establishing novel regenerative therapies.

DR KAREN BIRCH
My research group comprises a team of researchers with an intense focus on investigation of the interplay between female reproductive hormone fluctuation, exercise and cardiovascular health and function.

PROFESSOR ASIPU SIVAPRASADARAO
My laboratory is interested in understanding the cellular and molecular basis for how oxidative stress affects the biology of vascular and pancreatic cells.

PROFESSOR STUART EGGINTON
My group studies the mechanisms of blood vessel growth, using physiological remodelling to devise targeted therapeutic repair of a pathologically damaged microcirculation, and interactions between the cardiovascular and respiratory systems in exercise and hypothermia.
PROFESSOR SVEN PLEIN
My research is focused on the development, validation and clinical translation of cardiovascular imaging methods, in particular magnetic resonance imaging. I investigate heart failure and ischaemic heart disease.

PROFESSOR DAVID BUCKLEY
I work on quantitative magnetic resonance imaging (MRI) with a focus on tracer kinetic analysis of data acquired using dynamic contrast-enhanced MRI.

PROFESSOR JOHN GREENWOOD
My research is focused on the diagnosis and treatment of patients with coronary heart disease. In particular, large multi-centre clinical trials of Cardiovascular Magnetic Resonance (CMR) and Percutaneous Coronary Intervention (PCI).

PROFESSOR STEVEN SOURBRON
My research is in the use of quantitative and functional magnetic resonance imaging to characterize tissue function or metabolic activity. Clinically these data may be used to improve diagnosis, to plan interventions or therapy, or serve as biomarkers to evaluate the response to therapy.

PROFESSOR ARUN HOLDEN
My group constructs computer models of muscular organs that are based on electrophysiological data from membrane, cell and tissue experiments, with organ geometry from magnetic resonance imaging.

DR JAMES OLIVER
I am an adult congenital cardiologist with a research interest in vascular function of patients with repaired coarctation of the aorta.

DR STEVEN SOURBRON
My research is in the use of quantitative and functional magnetic resonance imaging to characterize tissue function or metabolic activity. Clinically these data may be used to improve diagnosis, to plan interventions or therapy, or serve as biomarkers to evaluate the response to therapy.

DR AZHAR MAQBOOL
My research focuses on the role of matrix proteins in cardiac remodelling following injury and in heart failure- including their utility as markers for sites of remodelling in vivo using MRI and as plasma biomarkers for cardiac disease.
PROFESSOR ROBERT ARIENS
I have found that the 3D structure of the fibrin clot is different in patients with coronary artery disease. My research is focused on mechanisms that regulate clot structure and how resilient it is, with the aim to develop new diagnostics and therapeutics for thrombosis.

DR RAMZI AJJAN
The bulk of the current work is focussed on analysing the effects of genetic variations in clotting factors (mainly fibrinogen and factor XIII) on clot structure and function using recombinant techniques.

PROFESSOR PETER GRANT
My research addresses the genetic and environmental determinants of fibrin structure/ function in relation to insulin resistance, type 2 diabetes and cardiovascular disease.

DR HELEN PHILIPPOU
My research is focused on understanding mechanisms of thrombosis by characterising the nature of end-stage coagulation protein-protein interactions, regulatory mechanisms and the influence of post-translational modifications of proteins in determining a blood clots resistance to fibrinolysis.

DR SIKHA SAHA
My research focuses on cellular remodeling and metabolic profiling in stroke, atherosclerosis, diabetes and related cerebrovascular diseases to investigate novel targets and develop diagnostic tools.

DR ANGELA CARTER
My research is focussed on identification and functional analysis of genetic and environmental risk factors for cardiovascular disease and clustering of cardiovascular risk factors in subjects with type 2 diabetes mellitus.

DR ELEANOR SCOTT
I study circadian influences on cardio-metabolic outcomes, including translational work on how 24 hour glucose control relates to adverse outcomes in women with diabetes in pregnancy.

DR KIRTI KAIN
My research interest is ethnic differences in atherothrombosis and identification of population-appropriate, economic, non-invasive, primary-prevention screening tools for cardiovascular disease in young-apparently-healthy South-Asians in the community.

DR PAUL BAXTER
My research involves the use of large cardiovascular disease registries and advanced biostatistical methods to understand the drivers of patient outcomes and disease mechanisms.

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ATHEROTHROMBOSIS AND DIABETES
Our research is focused on the application of computer-aided molecular design methods to the production of potent and selective small-molecule inhibitors of a range of therapeutically important enzymes and receptors.

We focus on the development of chemical tools to profile, image and perturb proteins that play a role in cardiovascular disease, which could lead to better mechanistic understanding of the onset/progression of disease and to new lead compounds in the development of diagnostics and drugs.

My group is interested in the design, synthesis and optimisation of small molecules for therapeutic application or their use in the elucidation of biological function.
CARDIOVASCULAR ENGINEERING

QUEEN’S ANNIVERSARY PRIZE

WELMEC CENTRE OF EXCELLENCE

TISSUE REGENIX

PROFESSOR EILEEN INGHAM
Research is focused on clinical and commercial translation of acellular allogeneic and xenogeneic cardiac valves and understanding of the mechanisms of acellular biological scaffold regeneration.

DR STACY-PAUL WILSHAW
Research is concerned with the development and translation of acellular allogeneic and xenogeneic vascular grafts for repair and replacement of large, medium and small diameter arteries.

PROFESSOR JOHN FISHER FMedSci CBE
Research into acellular biological scaffolds for cardiovascular applications is focused on the development of innovative, robust preclinical bioengineering test methods to ensure safety and reliability.
HEART FAILURE AND AUTONOMIC CONTROL

PROFESSOR CHRIS PEERS
Studies are focused on how physiological gases (oxygen, carbon monoxide and hydrogen sulphide) directly regulate ion channel function and hence various aspects of disease associated vascular smooth muscle and cardiac myocyte activity.

PROFESSOR DEREK STEELE
Most of my work addresses the sarcoplasmic reticulum Ca$^{2+}$ channel (ryanodine receptor) in cardiac and skeletal muscle.

DR SARAH CALAGHAN
My research focuses on the mechanisms which control the behaviour of individual cardiac muscle cells in the heart in response to a variety of stimuli. This information can be used to understand the function of the heart in both health and disease.

PROFESSOR JOHN TRINICK
We study structure and mechanism in muscle sarcomeres and their isolated component proteins. This includes dilated and hypertrophic cardiomyopathies caused by sarcomere mutations. We specialise in electron microscopy.

PROFESSOR JIM DEUCHARS
We investigate the organisation and function of the parts of the brain and spinal cord that contribute to control of the autonomic nervous system.

PROFESSOR ALISTAIR HALL
I lead a regional network that works to discover, develop and deploy effective strategies to: Identify and understand the mechanism of coronary artery disease. Prevent premature coronary artery disease.

PROFESSOR ED WHITE
We investigate the electrophysiological and contractile changes that occur in cardiac muscle in response to physiological (exercise) and pathological (heart failure) stimuli.

PROFESSOR JOHN TRINICK
We study structure and mechanism in muscle sarcomeres and their isolated component proteins. This includes dilated and hypertrophic cardiomyopathies caused by sarcomere mutations. We specialise in electron microscopy.
HEART FAILURE AND AUTONOMIC CONTROL

DR KLAUS WITTE
My work focuses broadly on the field of heart failure. My interests include the development of pathways to improve patient access to clinical services, and strategies to promote optimal use of existing drug and device treatments, as well as investigating new treatments.

DR SIMON HARRISON
My research interests lie in understanding the mechanisms of normal excitation-contraction coupling in the heart, how these processes are regulated and how a variety of ‘disease states’ (hypertrophy, sepsis, etc) affect the strength of contraction of the heart.

DR NEIL TURNER
The general aim of my research is to understand key intracellular signalling mechanisms that regulate adverse remodelling of the cardiovascular system, with particular focus on cardiac fibroblasts.

DR MATTHEW LANCASTER
We investigate the progressive changes in the pacemaker and ventricles of the heart with advancing age, which then predispose to problems in old age.

PROFESSOR JOHN COLYER
My group is interested in the control of cardiac function via post-translational modification (PTM) of proteins. We use quantitative approaches to explore these events in health and disease.

DR IAN WOOD
My group is interested in understanding the mechanisms responsible for altered regulation of gene expression in cardiovascular disease.

CHRIS PEERS, PROFESSOR AND GROUP LEADER
DISTINGUISHED VISITING LECTURER PROGRAMME

Professor Martin Bennett
Vessel wall and stem cell-derived cells

Professor Keith Channon
Endothelial redox signalling

Professor Costanza Emanueli
miR targeting for vascular regeneration

Professor David Newby
Novel approaches to cardiovascular imaging

Professor Sussan Nourshargh
Neutrophil-venular wall interactions in tissue damage

Professor Herbert Waldmann
Target identification for natural product-inspired compounds

Professor Antonio Vidal-Puig
Adipose tissue and the metabolic syndrome

Professor Stefan Neubauer
Clinical Magnetic Resonance Research

Professor Peter Kohl
Cardiac mechano-electrical interaction
CARDIOVASCULAR DISEASE AND DIABETES RESEARCH RETREATS

Team building, presentations, and discussions about new ideas, techniques and strategies
Ullswater, UK
WORLD CLASS RESEARCH OUTPUTS

We/The Centre provide an open and flexible organization and a culture of collaboration through which research can be successful.


McKeown, L., Moss, N.K., Turner, P., Li, J., Heath, N., Burke, D., O’Regan, D., Gilthorpe, M.S., Porter, K.E., Beech, D.J. (2012). PDGF maintains stored calcium through a non-clustering Orai1 mechanism but evokes clustering if the ER is stressed by store-depletion. Circulation Research 111, 66-76.

CARDIOVASCULAR AND DIABETES RESEARCH AT LEEDS

We would be delighted to hear from you with any requests for further information.

Director
David J Beech, FMedSci
Professor of Cardiovascular Science

Clinical Director
John P Greenwood MB ChB, PhD, MRCP
Professor of Cardiology and Consultant Cardiologist
The Centre is a partnership between the University of Leeds and the Leeds Teaching Hospitals NHS Trust.
Established 2008