

William Harvey Heart Centre



Barts and The London
School of Medicine and Dentistry



Queen Mary
University of London



**“
...a world-class
institute for
cardiovascular
research in the
heart of London
”**

**Professor Sir Nicholas Wright FMedSci
Warden of Barts and The London
School of Medicine and Dentistry**

Queen Mary, University of London and Barts and The London School of Medicine and Dentistry

Queen Mary is the fourth largest College of the University of London with 16,000 students, 3,000 staff and a budget of £285m per annum. In 1995 Barts and The London School of Medicine and Dentistry was formed from the Medical College of St Bartholomew's Hospital and The London Hospital Medical College merging with Queen Mary. Since 2002 the research spend of the Medical and Dental school has risen from £18.5m to £50m in 2011. In the UK Research Assessment Exercise in 2008, Barts and The London School of Medicine and Dentistry was among the top five medical and dental schools in the UK for the percentage of world-leading or internationally excellent research. Our partner Barts and The London NHS Trust is embarked on the largest hospital building programme in Europe at a cost of £1 billion. This will see all services for heart disease located at St Bartholomew's Hospital from 2014 creating the largest cardiovascular centre in the UK with 15,000 patient episodes per year. Our School of Medicine and Dentistry is determined to seize this opportunity and create a world-leading Heart Centre alongside the largest cardiovascular hospital serving the people of North East London.

William Harvey at St Bartholomew's Hospital.

William Harvey became Physician to St Bartholomew's Hospital in 1609, 402 years ago. Here he made observations which led to his proposal in 1623 that blood circulated around the body from the heart returning back to the heart. He was physician to James I of England, (James VI of Scotland) and Charles I. It is therefore fitting that our new Heart Centre should celebrate the continuing impact of William Harvey's discovery upon which foundation many treatments and diagnoses in modern medicine are based.

The William Harvey Heart Centre

Heart disease and stroke are the leading cause of death world-wide, with 17 million deaths a year and a serious unmet need for new therapies. At Barts and The London School of Medicine and Dentistry and Barts and The London NHS Trust we have a unified strategy for combining the world-class strength of the William Harvey Research Institute in cardiovascular pharmacology with new basic science strengths to establish an innovative Heart Centre to drive a research pipeline for novel therapies from bench to patient. This builds upon the legacy of Nobel Laureate Sir John Vane, who discovered how aspirin worked and prostacyclin, which today is still in use to treat pulmonary hypertension and twenty five years ago founded the William Harvey Research Institute here at Barts and The London School of Medicine and Dentistry.

The William Harvey Heart Centre is a 3172m² building for integrated therapeutics research. Our distinctive strategy for this Heart Centre will combine new basic science strengths in the study of how genes raise blood pressure, and how disorders of heart rhythm are triggered, alongside high-calibre stem cell biology and biomarkers research. These new basic science strengths will generate novel concepts, which combined with extant top-class pharmacology will help realise our ambition of translating discoveries into cardiovascular clinical care (translational research) at the new Barts hospital and elsewhere. In 2008 the potential of our strategy was recognised by the National Institute For Health Research by the award of a prestigious Biomedical Research Unit with an infrastructure award of £5.45m.

Our diverse east London community of two million people suffer appalling rates of heart disease possibly due to undiscovered risk factors that may offer the basis for new treatments. This is precisely why we are uniquely placed in the UK to act as a research window for these communities from emergent nations across the world.

The work of the William Harvey Heart Centre

The John Vane Chair of Cardiovascular Medicine

Gene discoveries into cardiovascular health

There are 1 billion people worldwide with high blood pressure and it is estimated that this contributes to 50 per cent of coronary disease and 75 per cent of stroke. Although blood pressure lowering therapies exist there remains an unmet need for novel therapies, as up to 50 per cent of those treated fail to achieve target, in part due to treatment resistance.

We lead international and national studies elucidating the genetic basis of these disorders and have identified and confirmed novel genes affecting blood pressure and coronary disease. To characterise the functional effects of these genes and establish whether they represent genuine drug targets is a vital next step for understanding whether they could help patients with blood pressure lowering or coronary disease. The drug development pipeline in this therapeutic area suffers from a paucity of drug targets.

Our aim is to unplug this scientific bottleneck and take this research to a completely new level by creating a major new group dedicated to the study of gene function or vascular pharmacology. This group will provide a completely new skill set to work alongside existent gene discovery scientists, vascular biologists and pharmacologists. They will significantly benefit from interaction with a proposed vascular biomarkers group that may serve to identify novel interactions between target genes and other pathways that could yield alternative therapies for exploration. This Chair will bear the name of the Nobel Laureate and Founder of the William Harvey Research Institute, Sir John Vane FRS.

Disorders of cardiac rhythm

Through our genetics programmes we have been able to develop an international partnership to study predisposing electrical features for dangerous rhythms on the electrocardiograph. These disordered rhythms are a significant cause of sudden death and hospitalisation, and many of the conventional therapies are variably effective.

We have appointed Professor Andrew Tinker to lead a major new group investigating disorders of heart rhythm. His work complements that of Professor Schilling who leads the Clinical study of electrical activity in the heart. A basic science chair and group in electrophysiology (electrical activity of the heart) will functionally characterise and investigate novel therapeutic targets generated from these genetic studies working alongside our strong clinical electrophysiology group at Barts and The London NHS Trust. This clinical group have developed and translated into clinical care novel approaches to computer mapping of triggers for disorders of rhythm. They are developing approaches using 3-dimensional advanced imaging provided by the NIHR Biomedical Research Unit to improve precision of the mapping and ablation of triggers for rhythm disorders within the heart muscle. The placement of the basic electrophysiology group alongside our stem cell group will enable the electrical behaviour of stem cells to be characterised prior to administration to humans.

Regenerative Medicine

In the UK there are 1.2 million survivors of heart attack and 900,000 people with heart failure. Although established therapies may delay progression of heart failure this may not last and, eventually, the only option may be transplantation. This has stimulated interest in the potential of stem cells as a regenerative therapy for heart disease.

At the William Harvey Heart Centre Professor Ken Suzuki and his team are driving translational programmes to evaluate a novel bioengineering technology using cellular sheets for surgical grafting onto damaged

The Effect of
Ligatures on
Blood Flow



The work of the William Harvey Heart Centre

heart tissue, which we hope to take into human studies within this new Heart Centre. This will establish the effectiveness and safety before translation into patients with heart failure.

In other work, we are already testing administration of bone-marrow-derived stem cells for heart attack and failure in one of the largest clinical trial programmes funded by £1.2m from the UK Stem Cell Foundation led by Professor Anthony Mathur. This has recently led to successful funding from the EU to undertake multicentre trials and develop new stem cell coated stents. The essential next step towards becoming a premier international translational centre is to add further basic science stem cell chair appointments to evaluate alternative stem cell strategies, such as embryonic stem cells.

Vascular Inflammation

Inflammation in the cardiovascular system is a major contributor to heart disease. At the William Harvey Heart Centre we have a strong interest in understanding vascular inflammation and how it may be targeted to reduce ill-health. We are just appointing a Chair of Cardiovascular Immunology to add strength and depth to the Vascular Inflammation Faculty.

Vascular Biomarkers Research

Early detection and prevention of cardiovascular disease is vital to addressing this burgeoning global epidemic. Understanding the genetic basis of vascular disease and novel modalities of therapy raise the possibility of identifying new biomarkers of disease and possibly of treatment effectiveness. Research into identification of new biomarkers is an under capacity area of research in the UK and strongly complements other research strands in the Heart Centre. Studies in the area of genetics, protein chemistry, microparticles and characterisation of the signatures of metabolism in body fluids are now beginning to generate candidate pathways or novel

biomarkers which could improve risk prediction, unmask novel therapies or predict treatment effectiveness. This research theme will allow definition of changes at the level of proteins and in metabolic signatures in body fluids. This important avenue of vascular biomarkers research is crucial to understanding cellular processes and strongly complements the Heart Centre's other work.

Translational Clinical Research Centre

The clinical trial is one of the greatest medical inventions of the 20th century. It is the fundamental tool of "scientific" medicine. By applying scientific method, it turned the age-old search for medicines from guess work into science. In 50 years, it delivered hundreds of drugs with known benefits and risks to patients, which have both improved and prolonged life.

Today's drug development process must continue to evolve if we are to deliver the wealth of new drug discoveries, including those emerging from advances in genetics and biotechnology. New and better medicines need to reach patients faster.

The clinical trial process is complex however, and requires collaboration from many different and diverse groups. It relies on the patients who agree to participate; it requires investigators to manage the studies and help safeguard their patients; it requires laboratory and pharmacy infrastructure and exemplary project and data management.

The ground floor of the new William Harvey Heart Centre houses a state-of-the-art centralised Clinical Trials Unit. This unit will run clinical studies for a range of sponsors, across multiple therapeutic areas including but not limited to: cardiovascular, respiratory, endocrinology, addiction and rheumatology. The Unit is staffed by an experienced team of research professionals consisting of clinicians, nurses and trial management who, in conducting these studies, can call upon a broad range of clinical experts from Barts and The London NHS Trust and Queen Mary, University of London.

New Heart Centre faculty

In conjunction with Barts and The London NHS Trust, the William Harvey Heart Centre is an integral part of the Quintiles Global Prime Site program. The vision of this program is to deliver the optimal patient research experience through professional, high capacity, transformational research partnerships. Queen Mary, University of London was Quintiles' first partnership within the Prime Site model and remains its most successful. This success is based on an open relationship placing the patient at the centre of all research activity and thus ensuring the highest standards of quality and delivery.

A key element is the resident Quintiles operations manager, based at the site to facilitate all aspects of clinical trial work. A critical strength of the relationship is that Queen Mary, University of London and Barts and The London hospitals retain complete freedom to accept and participate in non-Quintiles trials, highlighting Quintiles commitment to developing research within the UK as a whole.

Advanced Cardiovascular Imaging

Advanced cardiovascular imaging of the heart and circulation is increasingly important for diagnosis and treatment of patients with heart disease.

In 2008 the NIHR awarded a Cardiovascular Biomedical Research Unit to Barts and The London from which we have attracted an excellent imaging faculty and created state-of-the-art advanced imaging infrastructure to more deeply characterise patients in early phase trials. This strongly complements our substantial expansion of clinical trials activity. We have committed funds to sustain this step change in imaging with the new Barts Heart Hospital by increasing provision from 1 to 5 imaging suites.



Adrian Hobbs PhD

Professor of Cardiovascular Pharmacology

Adrian Hobbs completed his BSc in Pharmacology, obtaining First Class Honours at King's College London in 1989. He investigated the role of nitric oxide (NO) as a neurotransmitter in non-adrenergic, non-cholinergic (NANC) nerves. He took up a post-doctoral position in the laboratory of Nobel Laureate, Professor L.J. Ignarro, at UCLA under the auspices of Fulbright-Hays and American Heart Association Fellowships. He has successfully won support from the Wellcome Trust, BHF and BBSRC, as well as securing his own personal funding in the form of Wellcome Trust Career Development and Senior Fellowships. His group focuses on the guanylate cyclase family of enzymes and the interaction between NO and natriuretic peptides in the cardiovascular system. Recruited from UCL, Adrian has been appointed to the William Harvey Heart Centre to develop new therapies for heart disease prevention.



Andrew Tinker FRCP

FMedSci holds Wellcome and BHF Programme Grants and is an international leader in Electrophysiology (EP) Research into ion channels.

He has published 47 high impact papers (02-10) which have been cited 681 times and holds two programme grants from the British Heart Foundation and the Wellcome Trust. He has been recruited from UCL to lead our Disorders of Heart Rhythm grouping and complement clinical strength at Barts and The London NHS Trust and our National Institute for Health Research Cardiovascular Biomedical Research Unit, creating a major international Centre for this important cause of heart disease.



Medical College of St Bartholomew's Hospital Trust and Charterhouse Square

In 1995, Parliament transferred Charterhouse Square to the Trust on the merger of Barts and The Royal London Medical Colleges with Queen Mary and Westfield College, University of London. The land was once the eastern part of a Carthusian Priory, The London Charterhouse (founded 1371), and housed the choir monks in a quadrangular Great Cloister, built around the Cloister Garth, now called The Green.

The western part of the Priory, together with the southern fringe of The Garth - the burial ground of the monks - has belonged for four hundred years to Sutton's Hospital, founded in 1611 to provide a school for boys (Charterhouse School) and an almshouse for old gentlemen.

The eastern part has been home to two schools, Charterhouse School (1611-1872) and Merchant Taylors' School (1875-1933), and then Barts Medical College (1933-95). When Merchant Taylors' School moved to Northwood, Barts Hospital bought the land for the College.

The ground where the William Harvey Heart Centre now stands was originally a wilderness at the northern edge of The London Charterhouse. In the 1860s, Sutton's Hospital sold part of the land for the widening of Clerkenwell Road. In the same decade, Merchant Taylors' Company bought the remainder of the site when it began to acquire the land for Charterhouse School. The Company let the land for the construction

of tenements and warehouses, whose rents would help pay for the building of the School. They would be destroyed in May 1941.

In 1952-53, the Medical College acquired the bombsite with the help of the University Grants Committee and levelled it for use in a large scheme of reconstruction. While new buildings were erected in the rest of the Square, for over fifty years the bombsite provided only car parking and two tennis courts.

Together with the Merchant Taylors' old school gymnasium and the College's physics tower, the bombsite has now provided the footprint for a development by the Trust. This has been realised by the Trust's development partner, Thornsett Homes plc, and their builder, Ardmore.

The development comprises 183 private apartments, 43 'social housing' apartments and shops. As part of the deal, Thornsett provided the Trust with 3172 m² of space for the William Harvey Heart Centre.



The gymnasium and rifle range of Merchant Taylors' School in the early 1920s, with tenements showing beyond



The Physics Block of Charterhouse Square after air-raid damage, 1941

The William Harvey Heart Centre was opened by Sir William Castell LVO on the 7th July 2011.

Our donors and supporters: Queen Mary, University of London gratefully acknowledges the support of the following:

St Bartholomew's Hospital Medical College Trust

St Bartholomew's Hospital Medical College Trust leases both land and buildings to the College for the use of the Medical and Dental School, free of charge; awards scholarships to undergraduates and research studentships to postgraduates; and makes other grants in support of students and of research. It is the principal donor to the Heart Centre, for which it has provided the building, some equipment and other resources. In addition, the Barts Foundation for Research, embodied in the Trust since 2008, has made a significant contribution towards the cost of fit-out.

Quintiles

Quintiles is the only fully integrated bio and pharmaceutical services provider offering clinical, commercial, consulting and capital solutions. Our 22,000 employees in 60 countries have helped develop or commercialize all of the top 30 best-selling drugs.

National Institute for Health Research

The goal of the National Institute for Health Research (NIHR) is to create a health research system in which the NHS supports outstanding individuals, working in world class facilities, conducting leading edge research focused on the needs of patients and the public.

The Department of Health

The Department of Health (DH) exists to improve the health and wellbeing of people in England.

The Charles Wolfson Charitable Trust

The Charles Wolfson Charitable Trust generates income from property and other investments in order to make grants to various registered charities including, but not exclusively, in the fields of medicine, education and welfare.

The Wolfson Foundation

The Wolfson Foundation, established in 1955, is a charity that aims to support excellence, generally through the funding of capital infrastructure in the fields of science and medicine, health, education and the arts & humanities. The endowment of the Wolfson Foundation is currently some £725 million, with an annual allocation of approximately £30 million. By 2010 over £600 million had been awarded in grants (in excess of £1 billion in real terms). Over 8,000 projects have been funded.

Barts and The London Charity

Barts and The London Charity is an independent charity supporting Barts and the London NHS Trust (St Bartholomew's Hospital, The Royal London Hospital and The London Chest Hospital), Barts and The London

School of Medicine and Dentistry and The School of Community and Health Sciences. The Charity's vision is to be a leading charity promoting excellence in healthcare. Its mission is to raise, invest and grant funds for innovation and improvement in patient care, medical research and education.

Queen Mary, University of London

Queen Mary, University of London is one of the UK's leading research-focused higher education institutions with some 16,000 students and postgraduate students. Amongst the largest of the Colleges of the University of London, Queen Mary's 3,000 staff deliver world-class degree programmes and research across three faculties: Science and Engineering; Humanities and Social Sciences and the School of Medicine and Dentistry.

One of the rising stars in the UK higher education, Queen Mary was ranked 11th nationally in the last Research Assessment Exercise, and was rated as one of the world's elite universities in the 2010 Times Higher Education's Top 200 World University Rankings (120th place).



Doctor William
Harvey



Contact

Professor Mark Caulfield FMedSci
William Harvey Research Institute
Barts and The London School of Medicine and Dentistry
Queen Mary, University of London
John Vane Building
Charterhouse Square
London
EC1M 6BQ
Tel: 020 7882 3402
email: m.j.caulfield@qmul.ac.uk