UNIVERSITY OF BIRMINGHAM

Job description

Post title and post number	NIHR Clinical Lecturer in Neurology – 49696
Organisation advertising Description	School of Clinical and Experimental Medicine College of Medical and Dental Sciences
Post number	49696
Full-time/Part-time	Full Time
Duration of post	Fixed term for 4 years until CCT is reached, whichever is sooner
Post is open to:	Internal and external candidates
Grade	Clinical
Salary	£31,301 to £54,199 a year
Terms and conditions	Clinical Staff
Closing date	15 November 2013

Job Summary

This new, NIHR funded, post is focused on supporting the research efforts in brain injury, plasticity and repair at the University of Birmingham. This research will be embedded within the neurorehabilitation, neurotraumatology and neurodegeneration research programmes and will draw on the strengths of these themes. Neurorehabilitation is led by Dr SG Sturman who will provide clinical and educational support for the post. Neurotraumatology is led by Mr A Belli, Reader in Neurotraumatology, who has strong interests in traumatic brain injury and leads several collaborative research projects with neurorehabilitation. Neurodegeneration research is led by Professors C E Clarke, K Morrison and A Williams with interests in Parkinson's disease and motor neurone disease. There is extensive collaboration with the University Sections of Neurotrauma and Neurodegeneration led by Professor A Logan and the School of Psychology led by Professor K Shapiro.

It is anticipated that the successful applicant will undertake a programme of research in neurorehabilitation with the opportunity to gain considerable clinical and academic experience of acute brain injury and neurodegenerative conditions, as well as neurorehabilitation itself. The post will be based within the School of Clinical and Experimental Medicine, College of Medical and Dental Sciences, University of Birmingham.

The College houses state-of-the–art technologies and expertise to facilitate the research career of the successful applicant. These include the newly established £20M Surgical Reconstruction and Microbiology Research Centre co-funded by NIHR and MoD, which includes neurotrauma as one of its core themes. The post-holder will have access to the facilities of the £28M Institute of Biomedical Research, which provides access to core technologies including DNA sequencing, proteomic and metabolomic facilities and advanced imaging facilities. The Wellcome Trust Clinical Research Facility at QEHB provides a range of clinical research facilities including dedicated inpatient and outpatient accommodation, staffed by trained personnel and is linked to an HTA approved tissue bio-repository. The Clinical Trials Unit within the College is one of the largest in the UK and provides access to essential skills (statistics, trial design, randomization and outcomes) for clinical trial activity.

This NIHR Clinical Lecturer post is available for 4 years or until CCT plus 6 months (whichever is sooner). The post provides the opportunity for higher and advanced sub-specialist specialist training in Neurology alongside research and contribution to teaching in a variety of related subspecialties. The clinical duties of the post will be based in West Midlands Higher Speciality training scheme for Neurology. It is envisaged that a substantial amount of training will take place at hospitals within Birmingham, in close proximity to the University.

The applicant must have experience in the diagnosis and management of patients with neurological disorders and it is likely that they will have already have made substantial progress with higher training in neurology. Additionally a background in neurorehabilitation, acute brain injury, cognitive neurology or neurodegeneration would be advantageous. Postgraduate qualifications (MD or PhD) are essential. Applicants must have a firm commitment to a career in academic Neurology in the field of neural recovery, neurorehabilitation, or neurodegeneration.

Main duties of the post

A	**ACADEMIC**	% (of academic time)
1.	Individual and Group Research Projects • To perform clinical and/or laboratory based research studies complementing the academic interests of the Neurotrauma and Neurodegeneration Section of the School of Clinical and Experimental Medicine under the supervision of Mr Tony Belli and Dr S Sturman • Attendance at research group meetings and the seminar programme at the **Neurotrauma and Neurodegeneration research group**	45
2.	Analysis of data from experimental models and subsequent presentation and publication • To apply statistical methods to analyse scientific study data. • To prepare study findings in a format appropriate for speech or poster presentation. • To write research papers based on the findings of the studies performed in a format appropriate for publication in scientific and medical journals.	15

3.	Participate in writing grant and research ethics application • To prepare grant applications for the funding of proposed future studies, to bodies such as the Wellcome Trust and the Medical Research Council. • To prepare applications to the Research Ethics Committee for the approval of proposed new Cl led studies.	25
4.	Contribute to undergraduate and post graduate teaching programmes for a variety of courses including the MB ChB, BMedSc and BDS courses	15

Decision Making/Problem Solving

Without reference to others

- Solving any problems arising while performing the basic and specialised research techniques forming the core component of the research element of the post. Ensuring that stocks of consumables are maintained and that equipment is safe and serviceable.

After consulting others

- Any problems arising from new or unfamiliar techniques or research activities.

Or that would be referred to someone else

- Any major problems involving plant or equipment beyond the remit of the post holder.

Knowledge, Skills, Qualifications & Experience Required

- Full General Medical Council registration
- Membership of Royal College of Physicians
- Higher degree (MD/PhD)
- Postgraduate experience in research
- Knowledge of clinical governance and ethics
- Knowledge of research methodology, statistics and trial design.

Communication skills

Contact // Purpose/skills required

Mr Belli, Dr Sturman, Prof Logan other PIs and members of the research group // Planning experiments and reporting on tests carried out

Clinicians and Scientists in the research group and IBR // Learning specialised techniques group

B	**CLINICAL**	
	50% w.t.e. as Specialty registrar in Neurology at a clinical unit, as determined by the West Midlands Higher Specialist Training Committee. [see below]. The Clinical Lecturer may rotate with other Specialist Registrars in Neurology, to provide optimal clinical experience.	

Proposed Job Plan

The exact timetable will depend on the research and training requirements of the post-holder but the time will be split between 50% academic time and 50% NHS training/service. The research and clinical training needs will be identified from regular reviews and formal appraisal.

Description of research component of programme
The Clinical Lecturer would build on the existing themes of neurotrauma and neurodegeneration rehabilitation research within School of Clinical and Experimental Medicine, with the aim of further enhancing research in this strategically important area.

These broad themes include the following: biomarkers of acute brain injury for outcome prognostication and patient stratification, neuroendocrine dysfunction following traumatic brain injury, cognitive decline and epilepsy following neurotrauma, spinal cord injury and repair. Neurotrauma and Neurodegeneration research is a cross-cutting theme that thrives on collaborations with non-clinical Departments and Schools, such as Chemical Engineering, Chemistry, Sport and Exercise Science, Psychology, and Computing Science, as well as numerous clinical disciplines. This will give the post-holder the opportunity to become involved in or develop cross-disciplinary rehabilitation research projects and take advantage of world-class facilities and expertise across the whole university. The Queen Elizabeth Hospital Birmingham (QEHB), University Hospital of North Staffordshire and University Hospital Coventry have recently become Major Trauma Centres, which will allow the post-holder to have access to one of the largest cohorts of major trauma patients in the UK for clinical studies. In addition, QEHB houses the Royal Centre for Defence Medicine and is where the vast majority of military patients are treated. This presents the post-holder with a unique opportunity for clinical research in the most complex and challenging areas of Neurology.

Teaching

The post holder will be expected to play an active role in delivering bedside and small group teaching to clinical medical students (no more than 2 hours per week). In addition they will be required to undertake occasional lecturing and small group teaching sessions on rehabilitation topics on the undergraduate MBChB, BMedSc and BDS courses. There may be additional duties in helping with FY2 teaching and in the organisation of training for SpRs.

Description of clinical training component of programme
The post attracts specialist trainee status (NTNs), with the clinical components of training being part of the West Midlands' Neurology speciality programme which is delivered in rotation across University Hospital Birmingham, University Hospital North Staffordshire, University Hospital Coventry & Warwickshire, The Royal Wolverhampton Hospitals and Sandwell and West Birmingham Hospitals NHS Trust.

Clinical placements will be determined by the West Midlands Higher Speciality Training Committee for Neurology, currently chaired by Dr David Nicholl and will provide all of the necessary training requirements in Neurology tailored to the individual needs of the appointee.

Further details on the clinical training programme can be found at the West Midlands Deanery website: http://www.westmidlandsdeanery.nhs.uk/SpecialtySchools/Medicine/SpecialtyTrainingProgrammes/Neurology.aspx

The lecturer will undergo rotational posts according to his/her clinical training needs, but whenever possible these will be in the Birmingham area.

On call rotas are different in different hospital but in line with the European working time directive.

Out of Hours commitment

The basic working week is 40 hours. In addition, the postholder will be expected to undertake out of hours on-call commitment that will vary depending on the duties of the post, but will not exceed the limits defined in the Terms and Conditions of Service paragraph 20.

The organisation

The University of Birmingham is a thriving and dynamic institution that combines over a century of heritage with one of the most compelling and ambitious agendas in higher education. Ranked amongst the world's top 100 institutions, the University is structured to promote faster decision making and to enable it to capitalise on its academic range and financial strength. The University is organised into five academic colleges, with a University Executive Board, led by our Vice-Chancellor, Professor David Eastwood.

Central to our agenda is the development of the University's five-year strategic plan 'Shaping Our Future: Birmingham 2015', that builds upon an existing and ambitious programme of change, 'Sustainable Excellence', developed to establish Birmingham as a leading global university.

The strategic plan is based around five mutually supportive goals: enhancing research power; providing students with a distinctive, high-quality experience; sustaining and utilising financial strength; enhancing performance as an engaged university; and becoming the destination of choice amongst our peers. The confidence of the University's ambition is, in part, underpinned by one of the strongest financial positions in the UK HE sector. The University is currently forecasting a turnover of £460 million for the financial year 2011/2012 and carries significant cash surpluses with no borrowings. This is enabling it to invest in high-quality research and to enhance still further the educational experience for its students, as well as to continue to improve its estate and infrastructure, despite the prevailing economic conditions.

Over 90% of Birmingham's research was rated as world leading or of international quality in the 2008 UK Research Assessment Exercise (RAE). With world-leading activity across a range of subjects, it remains one of the UK's most broadly-based research-led universities.

The University's cultural and intellectual assets include the Shakespeare Institute at Stratford-upon-Avon, the Barber Institute of Fine Arts on campus and the Ironbridge Institute in Shropshire. The University also boasts the internationally renowned Lapworth Museum of Geology and Winterbourne House and Garden, a unique Edwardian heritage attraction that is home to over 6,000 plant species from around the world. In total the University's economic value to its region is £780 million.

Founded in 1900 and believed to be the UK's first redbrick university, Birmingham established a new model for higher education, breaking away from the Oxbridge tradition. Through the foresight of our founders we have inherited one of our greatest assets – our beautiful parkland campus, which is currently undergoing a £175 million enhancement programme that includes the new Bramall Music Building, a new sports centre containing the city's first 50m swimming pool and a proposed library

development to provide outstanding facilities for students and researchers alongside an open access cultural hub with facilities available to the public.

The University was founded through philanthropy and fundraising. This is just as important today. Birmingham's 'Circles of Influence' campaign has raised over £60 million since its launch in 2009 and continues to provide funding for five priority areas – Health and Lifestyle; Children and Young People; Heritage, Culture and Sport; Student Support; and Innovation and Immediate Impact.

With 28,000 students from 150 countries, the quality of the student experience offered at the University of Birmingham remains of paramount importance. The University is one of the leading members of the Russell Group in terms of the size of its graduate school and the quality of its student experience as shown by the National Student Survey. As well as high-quality teaching, students also enjoy an enriched experience through other activities such as sport, for which Birmingham is ranked second in the UK.

As Birmingham seeks to extend its global footprint further it is investing in its international strategy, having established overseas offices in India, China and Brussels. These new offices are developing existing contacts and forging new partnerships with academic colleagues and businesses across the Asia Pacific Region and into Australasia. Birmingham is also building strategic partnerships in North America (notably Chicago) and through its membership of Universitas 21.

The city of Birmingham

Birmingham is a major European centre and the second city of the United Kingdom. It is a city of business and ballet, canals and world-class concerts, jewellery and jazz, historical interest and cosmopolitan atmosphere. Birmingham is also the ideal base for exploring one of Britain's most fascinating regions for tourism, being within an hour's drive of Stratford-upon-Avon, Warwick, the Potteries, and the Cotswolds.

The new heart of Birmingham is symbolised by Symphony Hall, considered one of the greatest concert venues in the world. Symphony Hall forms part of the impressive International Convention Centre, which overlooks attractive canals at the hub of the UK's canal network. This setting is a very suitable venue for the CBSO, the globally respected symphony orchestra. At the magnificent Hippodrome Theatre is the internationally renowned Birmingham Royal Ballet, adding further cultural depth to the city. Apart from London's West End, Birmingham boasts the highest concentration of live theatre in the UK, including regular tours by the major opera companies.

The City Museum and Art Gallery houses the world's finest collection of Pre-Raphaelite paintings, alongside a major collection of Old Masters, Modern and Contemporary pictures. The Barber Institute of Fine Arts houses one of the best UK university collections of Impressionist and Renaissance art. The restored Gas Hall

Gallery has international touring exhibitions, while the Halcyon and Ikon galleries feature innovative contemporary works. National landmark sites abound, including the National Indoor Arena, the National Exhibition Centre, National Motorcycle Museum, National Car Heritage Museum and the National Sealife Centre.

The iconic Bullring Centre is the largest dedicated shopping facility in Europe. Sports and recreation are well served; the city offers international Test cricket, top-flight football, International Championship golf and top-class rugby. The International Convention Centre and National Indoor Arena have spawned a whole new Downtown area at the centre of the city. The National Exhibition Centre, on the outskirts to the city, remains one of the largest exhibition facilities in Europe.

Birmingham is at the crossroads of the UK's motorways. From Birmingham International Airport, more than a dozen different airlines operate scheduled services to 60 destinations worldwide. The University is the only mainland UK university to have its own railway station, while 50 million passengers a year use Birmingham New Street Station, which will be at the centre of the proposed high speed rail network. London is 90 minutes away by shuttle service, with trains every 20 minutes until the evening. There is a high standard of all types of private accommodation, with high-quality affordable family housing in several attractive residential suburbs. Public parks and large domestic gardens are a special feature of this greenest of European cities. Quality public and private schools are widely available, with several consistently rated in the top 10 on examination performance in annual league tables of England and Wales.

The College of Medical and Dental Sciences

The University's structure is one of Colleges and Schools, and the College of Medical and Dental Sciences contains five Schools that cover the whole range of pre-clinical and clinical disciplines:

- School of Cancer Sciences
- School of Clinical and Experimental Medicine
- School of Dentistry
- School of Health and Population Sciences
- School of Immunity and Infection

The principal base of the College lies immediately between the main campus of the University and the new Queen Elizabeth Hospital, University Hospitals Birmingham NHS Foundation Trust. Other key NHS Trust buildings on the same campus include Birmingham Women's NHS Foundation Trust and the Birmingham and Solihull Mental Health NHS Foundation Trust's Barberry Hospital which is part of the National Centre for Mental Health – Birmingham.

Research

The College of Medical and Dental Sciences is the largest of the University's five Colleges and, with over 800 researchers and in excess of £66M research funding per year, it represents a major international centre for biomedical research.

Our overall research objective is to develop and promote excellence in basic and clinical science with an ultimate goal of delivering improvements in human health. We take pride in a truly translational pipeline, delivering cutting edge clinical trials and patient studies, underpinned by cell and molecular biology research on both model organisms and humans.

Strategically, our research encompasses seven major internationally-renowned research domains:

- Cancer
- Genetics and Development
- Health and Population Sciences
- Cardiovascular, Respiratory and Neurological Sciences
- Endocrinology and Metabolism
- Dentistry
- Immunity and Infection

Importantly, each domain is allied to a range of clinical specialties through which the College links its basic research to translational endpoints.

We have great pride in our interactions with local NHS environment, most obviously exemplified through 'Birmingham Health Partners', an exciting collaborative platform between the University, Birmingham Children's Hospital and University Hospitals Birmingham NHS Foundation Trust (UHBFT) that will enable rapid movement from laboratory discovery to patient benefit, fostering new therapeutic and healthcare innovations by creating a truly integrated environment for researchers and clinicians.

Education

Each year the College trains 374 medical students including the Graduate Entry course (105 medical students are able to intercalate on a choice of programmes after the second, third or fourth year of their course), 75 dental students, 21 biomedical materials science students, 96 medical science students and 104 nursing students.

2013 also sees the introduction of a new undergraduate Pharmacy programme that will initially recruit 70 students per year. Medical student teaching takes place at all hospitals in Birmingham, but has recently expanded into many of the hospitals in the Black Country.

There are also approximately 475 postgraduate taught students and 382 research students in the College, managed by a cross-College Graduate School. The College

has excellent library and reference facilities including the newly refurbished Barnes library and Doug Ellis Learning Hub.

Programmes and Facilities

The College has encompassed some major developments, expansion and improvement to its facilities, education delivery and research activity in recent years.

This includes a £35m Institute of Biomedical Research, a state-of-the-art £11.8m Wolfson Centre for Medical Education and a prosectorium facility for anatomy teaching incorporating 10 ventilated tables and high tech AV teaching aids. The College has also created a new £1m phantom head teaching laboratory facility within the School of Dentistry.

Among the most recent investments is refurbishment of the Medical School building foyer and Barnes library providing impressive visitor and student services facilities. To further our research strengths the College developed the state-of the-art Advanced Therapies Facility which includes a new purpose built HTA-compliant biorepository (Human Biomaterials Resource Centre),Cell and Gene Therapy Pharmacy, and commercial spin out laboratory. Alongside these developments, the NIHR/Wellcome Trust Clinical Research Facility (CRF) received the largest award renewal in the UK of £12.8 million from the National Institute for Health Research (NIHR) to support its activity and to strengthen its current expansion. The College also launched the Health Research Bus, a mobile clinical research facility funded via Birmingham Science City. This was the first of its kind and a great development for clinical research in the College.

The collaboratively-funded NIHR Institute for Health Research Surgical Reconstruction and Microbiology Research Centre was developed in 2011, which combines clinical practice in the battlefield and innovation in medical research to benefit all trauma patients.

In 2012, the College secured high quality laboratory and clinical research facilities within the new University Hospitals Birmingham NHS Foundation Trust (UHBFT) Queen Elizabeth Hospital, through our **Centre for Translational Inflammation**. It houses a number of national and international centres including the **MRC-ARUK Centre for Musculoskeletal Ageing**, **ARUK Centre for Experimental Medicine** (BEAT RA), the **NIHR Translational Research Partnership** in Joint and Related Inflammatory Diseases and the **Healing Foundation Burns Research** Centre.

In 2012 government funding was also announced for the development of a £24m Institute of Translational Medicine in Birmingham in collaboration with UHBFT, bringing Birmingham into the forefront of international translational medicine research. The institute will help progress the very latest scientific research findings

from the University into enhanced treatments for patients across a range of major health issues including cancer and liver disease.

School of Clinical and Experimental Medicine

The School of Clinical & Experimental Medicine was created in 2008 as part of a new College structure within the University. The objectives of this reorganisation were to bring together extensive expertise in a wide-ranging field of medical sciences and to develop a highly motivated School with an integrated clinical and basic science portfolio, associating excellence in research, education and clinical leadership. The School plays a major role in the wider portfolio of research and teaching carried out by the College of Medical & Dental Sciences. Visit our website for full information http://www.birmingham.ac.uk/schools/cem/index.aspx

A diverse but highly collaborative and interdisciplinary grouping, the School of Clinical & Experimental Medicine has well over 200 research-active staff who together hold around a quarter of the College's total live external funding (and around an eighth of total University research funding). There are also over 500 honorary staff and 60 support staff embedded within the School. These staff are grouped into six major academic Sections, each encompassing education and research in a particular theme:

Cardiovascular & Respiratory Science: Encompassing disciplines including Cardiology, Cardiothoracic Surgery and Cardiovascular Sciences, as well as Respiratory Medicine, this Section focuses research on myocardial diseases, vascular biology, and lung injury and immunobiology. In myocardial diseases, key areas of study are the pathophysiology of heart failure, novel techniques for cardio-protection during surgery and following ischaemic reperfusion injury, the role of thrombosis and haemostasis in atrial fibrillation, new approaches to understanding and management of life-threatening cardiac arrhythmias, and the link between chronic kidney and cardiovascular diseases. Vascular research centres on vascular control of blood flow, and vascular inflammation, thrombosis and angiogenesis. Studies of signalling by receptors in platelets are allied with analysis of the roles of haemostatic, thrombotic and inflammatory processes in vascular diseases. In the field of respiratory science, research centres on inflammatory mechanisms underlying lung injury and fibrosis in disorders including chronic obstructive pulmonary disease, vasculitis and interstitial lung disease. With 70 staff (both clinical and basic scientists) and live funding of £11 million, translational, therapeutic and basic scientific studies in all of the above areas are funded by the British Heart Foundation, Wellcome Trust, MRC, BBSRC, NIHR and the pharmaceutical industry.

Endocrinology, Diabetes & Metabolism: With around 50 researchers who together hold more than £20 million in live funding, together with Reproduction, Genes & Development researchers in this Section were the major contributors to achievement of our ranking 4th nationally in the 2008 RAE ("hospital based clinical subjects") (75% research rated world or internationally leading), with a strong portfolio of translational

research underpinned by large clinical datasets. Current initiatives are supported by major awards from MRC, the Wellcome Trust and the European Commission to study a range of topics including glucocorticoid, gonadal steroid and thyroid hormone actions and pre-receptor regulation, as well as pathogenesis of endocrine autoimmune diseases and endocrine cancers. A range of programme grant funded research is being undertaken in diabetes, obesity and metabolism; fetal and reproductive endocrinology; thyroid tumourigenesis and molecular investigations of endocrine and hormone-dependent cancer predisposition and pathology.

Neurotrauma & Neurodegeneration: Encompassing neurology, psychiatry and neurosciences, research within this Section of the School brings together expertise covering aspects of neuroscience ranging from cellular and molecular, to the whole brain, through to the extensive network of neuronal connections across the body, and how these biological underpinnings interact with psychological and social factors to cause neurological and psychiatric disease. The new Queen Elizabeth Hospital and National Centre for Mental Health that adjoin the Medical School are facilitating our focus on translational neuroscience so that we can apply insights gained through fundamental research on brain structure and function to develop novel pharmacological and cellular therapies for neural damage and psychiatric disease, with a clear goal to promote continuous interaction amongst fundamental and clinical neuroscientists to rapidly translate research from bench to bedside. With around 50 research-active staff, major research teams are neuropharmacology; neurodegeneration and repair; neuronal networks; and psychiatry.

Reproduction, Genes & Development: Covering obstetrics, gynaecology and paediatrics as well as a significant portfolio of clinical genetics, activity in this Section reflects three broad areas of research, education and clinical activity: Obstetrics and Gynaecology; Paediatrics and Child Health; and Medical and Molecular Genetics. The complementary interests of each of these areas enable the theme to make a unique contribution through its research and teaching, to the healthcare of mothers and children in the whole of the West Midlands region. Multidisciplinary reviews and trials on numerous aspects of care (both diagnostic and therapeutic) have been undertaken in aspects of Reproduction, Genes & Development. The School is home to the WHO Collaborating Centre for Reproductive Health, the only centre of its kind in the UK. In addition, translational research is performed within the Wellcome-funded Clinical Research Facility within the University Hospitals Birmingham NHS Foundation Trust and the Paediatric Clinical Research Facility within the Birmingham Children's Hospital, the first of its kind in the UK. With around 60 staff and over £12 million of live funding, particular highlights of activity include critical appraisal of the evidence and the initiation of clinical trials in areas as diverse as dysfunctional uterine bleeding, the detection of Group B steptococcus in pregnancy, the management of intractable pelvic pain in women, diagnostic tests in predicting hypertensive disease of pregnancy and intrauterine growth restriction and in-utero fetal therapy.

Pharmacy, Pharmacology and Therapeutics: The Pharmacy, Pharmacology and Therapeutics Section fulfils major roles in three broad areas of research, education and clinical activity within the School of Clinical and Experimental Medicine. Offering a lively and stimulating academic environment in which researchers, health professionals and students interact; all are connected by an interest in medicines - their discovery and development, their precise mechanism of action and their use to prevent and treat disease. Particularly relevant to this Section is our wide ranging expertise (research and education) in Pharmacology and Therapeutics and a new flagship investment by the University of Birmingham into Pharmacy, which includes expertise in novel drug delivery systems and medicine formulations that augment clinical pharmacology and translational research activities across the College and University. New Pharmacy education programmes include a DPharm for registered pharmacists and an MPharm course starting in 2013. Our major research groups are: Clinical Pharmacy and Pharmaceutics, Neuropharmacology, Clinical Pharmacology and Therapeutics.

***Medical Science & Education*:** Home to research within anaesthetics and intensive care medicine, clinical simulation, interprofessional learning, this Section plays a major role in both the research and teaching carried out within the School. Research in basic and clinical sciences is integrated, along with expertise in clinical trials, to advance the understanding and treatment of a spectrum of human disorders. Teaching takes advantage of state-of-the-art research expertise in these areas to deliver the highest standard of instruction. Particularly relevant to this theme is our wide ranging expertise (education and research) leading in areas of pedagogic research to enhance programme development and design and medical education itself.

School Infrastructure: Research in basic and clinical sciences in these areas is fully integrated in the School, which offers training in state-of-the-art facilities, including the Institute of Biomedical Research (IBR) and the Wellcome Trust Clinical Research Facility (WTCRF). The IBR is a £30m JIF-funded facility, the largest of its kind in the UK. In addition to extensive tissue culture and biochemistry laboratories, the IBR includes resources for proteomics and genomics together with containment facilities for work with micro organisms up to category 3. It also provides support for such key technologies as flow cytometry, Mo Flo cell sorting, confocal microscopy, laser capture dissection, sequencing and construct production, GC/MS platforms, array technology and real time qPCR, as well as extensive modern facilities for *in vivo* animal work and mouse breeding and an in-house service for embryonic stem cell work and the production of genetically modified mice. The WTCRF **(www.crf.bham.ac.uk)** is a flagship facility and one of five originally established in the UK, funded by a Wellcome Trust Millennial grant of £3.2 million in 2001. It was further awarded approximately £10m to extend its facilities to include gene therapy/pharmacy facilities, cardiovascular and metabolic research suites and to create the only dedicated children's WTCRF in the UK at Birmingham Children's Hospital. The School also has significant links with major NHS Trusts in the region including University Hospitals Birmingham NHS Foundation Trust (with the new

Queen Elizabeth Hospital opened in June 2010 adjacent to the College, a 1200 bed, £50+ million initiative, representing a major opportunity for clinical translation of basic science research), and within a number of other NHS Trusts, including Birmingham Women's and Children's Hospitals, as well as Heart of England, Sandwell and West Birmingham and Birmingham and Solihull Mental Health NHS Trusts, ensuring that our research, practice and strategy are well linked in with all of our neighbouring NHS Trusts.

Teaching takes advantage of the range of research expertise available to deliver the highest standard of instruction to both undergraduates and to postgraduates. Birmingham academic staff work closely with honorary staff with NHS appointments to contribute to undergraduate teaching across the MBChB and BMedSc programmes, as well as postgraduate programmes. Postgraduate qualifications are available in the form of a DPharm, MPhil / PhD by research, MD by research and taught Masters (MSc/PgD/PgC).