

# Drug Discovery

At the heart of one of the UK's largest clusters of life science businesses, the University of Birmingham and our teaching hospital University Hospital Birmingham, provide an outstanding environment in which to undertake clinical trials in common and rare genetic diseases at all stages of life, thanks in part to our ethnically diverse population catchment of more than five million people.

The University of Birmingham is committed to being at the vanguard of academic-led drug discovery and the search for the next generation of therapies that will benefit humankind. Recently, the University has invested nearly three quarters of a million pounds to develop a High-Throughput Screening (HTS) facility. The Birmingham Drug Discovery Facility contains a number of cutting-edge technologies required to enable Birmingham scientists to conduct translational life science.

Supporting this exceptional translational activity are a host of talented, interdisciplinary scientific researchers specialising in target and drug discovery, companion diagnostics and cutting-edge bioimaging technologies, toxicology and innovative pharmaceutical production processes. This interdisciplinary approach to research offers our collaborators access to the latest technological developments set within the translational context from bench to bedside.

## Our expertise

- Target and drug discovery
- Diagnostics and imaging
- Computational biology
- Synthetic biology techniques
- Design and development of drug delivery systems
- Biochemical engineering
- Molecular biotechnology

## Success and impact

- The EPSRC-funded Centre for Doctoral Training in Physical Sciences for Health (Sci-Phy-4-Health) is unique to the UK. The research programme benefits from partnerships with large multinational companies, SMEs, hospitals and public sector organisations.
- Scientists in our School of Chemistry have developed a sophisticated approach to sensing variations in sequences of DNA using fluorescence microscopy and novel detection probes, furthering the understanding of the origin of diseases with a genetic component.
- The Centre for Human Brain Health offers state-of-the-art imaging techniques such as fMRI, MEG, fNIRS and 3t MRI scanners to support research across the field of human brain health. This enables the characterising of brain structure and function in tandem with experimental therapies and new drugs across the lifespan of patients.
- The University's expertise in the development, characterisation and risk assessment of nanomaterials has been pivotal in the development of isotopic tags for nanoparticles. These tags can be used to trace the absorption of active ingredients in medical and healthcare products, from topical ointments to toothpaste, and in conjugating nanoparticles with proteins as mechanisms for drug delivery.
- The Phenome Centre Birmingham is an £8 million metabolic phenotyping facility led by internationally recognised metabolomics and clinical experts at the University of Birmingham, in collaboration with Birmingham Health Partners. The Centre provides a complete collaborative service offering expertise and advice to perform metabolic phenotyping studies from conception and experimental designs through data acquisition to data analysis and biological interpretation.





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'UNIVERSITY OF BIRMINGHAM SCIENTISTS ARE AT THE CUTTING EDGE OF GENOMICS AND METABOLOMICS RESEARCH IN THE ENVIRONMENTAL, MICROBIAL AND CLINICAL SCIENCES, AND ARE THEREFORE AN IDEAL TEAM FOR BECKMAN COULTER TO PARTNER WITH TO DEVELOP A VARIETY OF AUTOMATION SOLUTIONS FOR HIGH-THROUGHPUT OMICS BIOLOGY.' JULIE MOORE, DIRECTOR OF THE AUTOMATION AND GENOMICS BUSINESS UNIT IN BECKMAN COULTER'S LIFE SCIENCES DIVISION



## Key projects

**Open Innovation Drug Discovery (OIDD) platform:** our scientists have actively engaged with leading pharmaceutical company Eli Lilly in their interactive OIDD platform. Through OIDD, participants are able to gain access to Lilly's cutting-edge research tools and data in a hypothesis-driven approach to early drug discovery. Our scientists and students are encouraged to submit new compounds for screening through the OIDD platform. The benefit of this collaboration is mutual, and Lilly continues to integrate learnings from collaborative projects into its ultimate goal of uncovering innovative solutions.

**Tuberculosis drug discovery:** through a collaboration between our chemists and biosciences researchers and scientists from our industrial partner GSK, we are looking to turn initial compounds that possess anti-TB activity, identified from a large-scale screening programme, into compounds with drug-like properties. Our long-term goal is to transform these initial hits (in a Mycobacterium TB killing-based high-throughput screen) into lead molecules for future drug candidate selection.

**Advancing automation techniques for regulatory science research:** Beckman Coulter has entered into a collaboration with the University focusing on joint research projects that could lead to the development of higher-throughput technologies. This partnership involves sample and data sharing, exchanging know-how for improving hardware and software performance, and promoting the training of graduate students amongst other activities.

**Data science for health:** in collaboration with Chengdu's West China Hospital, one of China's biggest hospitals; our data scientists from the Centre for Computational Biology will gather, organise and analyse patient information under related laws and regulations from both countries and help improve healthcare for thousands of people. This will help link cutting-edge 'Omics' data with clinical information across a range of conditions.

'WE HAVE THE OPPORTUNITY TO WORK WITH WEST CHINA HOSPITAL WITH THEIR INVALUABLE KNOWLEDGE IN THEIR PATIENTS' CONDITIONS AND USE OUR DATA SCIENCE EXPERTISE IN FIELDS RANGING FROM PRECISION MEDICINE AND RARE DISEASES TO TRANSLATIONAL MEDICINE TO BETTER UNDERSTAND A BROAD RANGE OF CONDITIONS AND HELP DELIVER THE RIGHT DRUGS TO THE RIGHT PEOPLE.' PROFESSOR JEAN-BAPTISTE CAZIER, DIRECTOR OF THE CENTRE FOR COMPUTATIONAL BIOLOGY AT THE UNIVERSITY OF BIRMINGHAM AND LEAD FOR THE UNIVERSITY'S DATA INTENSIVE LIFE SCIENCES PROGRAMME AREA FOR THE ALAN TURING INSTITUTE

## Getting in touch

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