

Research themes



Research in pharmacy is focused in the following scientific disciplines:

Pharmacy practice

We are involved in a number of research areas related to the safe and effective use of medicines, such as patient adherence to medicines, the rational use of antibiotics, reducing medicines waste, the prevention of adverse drug reactions, and pharmacovigilance.

In paediatric medicines, research spans the latent risks of medication system to children, problems in medicines supply between primary and secondary care, and the barriers preventing the participation of children in clinical trials. At the other end of life, research is focused on the pharmacology and therapeutics of end of life care in a palliative setting.

Researchers are also involved in the examination and improvement of prescribing, from the utilisation of prescribing indicators to the education and training of prescribers. Birmingham University is responsible for the **SCRIPT** (<http://www.safeprescriber.org/>) West Midlands SHA prescribing project and research in interprofessional simulation-based training.

Pharmaceutics

In collaboration with the **West Midlands Medicines for Children Research Network** (<http://www.meds4kids.nhs.uk/>), researchers in pharmacy are developing a research centre with a focus on paediatric formulations and biopharmaceutics. The main aim of this centre is to develop age-appropriate medicines for children that are underpinned by scientific principles and design.

Researchers are also investigating the development of respirable formulations and improving the targeting of such formulations to central and alveolar regions of the lung to enhance local and systemic delivery. There is a particular focus on the development of inhalable dry powders prepared by spray-drying, and the use of polymeric materials to generate powders that exhibit a modified drug release profile.

In addition, researchers are developing novel nanomaterials as delivery vectors for cancer and other diseases. The ultimate goal is the use of these delivery vectors for the efficient delivery and targeting of drugs to the site of action. Nanotoxicology is a further area of particular interest of the group in an attempt to develop safe nanovectors.

Medicinal Chemistry and Drug Discovery

Medicinal chemistry research within the **School of Experimental and Clinical Medicine** (</schools/cem/index.aspx>), in particular, and the University of Birmingham, in general, is an ever growing and thriving discipline. Current research interests in medicinal chemistry fall within the theme of the design, synthesis and development of novel small molecules that have the potential to treat diseases. Such molecules are currently being explored for the treatment of hypertension, inflammatory bowel syndrome (IBS) and cancer.

Some of the current projects currently being pursued are:

- Design, synthesis and development of small molecule kinase inhibitors as potential treatments of hypertension, glioblastoma and neuronal injury.
- Design, synthesis and development of modulators of 5-HT receptors with novel mode of action and/or modified distribution characteristics.
- Development of new classes of siRNAs as anticancer agents.
- Development of a chemical toolkit to selectively control steroidal synthesis and signalling in disease-relevant cellular systems.
- Building synthetic microtissues for drug discovery.

The medicinal chemistry research based at the department of pharmacy is being carried out in close collaboration with colleagues from the schools of **Chemistry** (</schools/chemistry/index.aspx>), **Biosciences** (</schools/biosciences/index.aspx>) and **Engineering** (</schools/chemical-engineering/index.aspx>).

The University has state of the art medicinal chemistry research facilities that include numerous NMR instruments, mass spectrometry facility and other analytical instruments as well as a high throughput screening suite.

For informal inquiries regarding medicinal chemistry and drug discovery research please contact **Dr. Youcef Mehellou** (</staff/profiles/cem/PT/mehellou-youcef.aspx>) (y.mehellou@bham.ac.uk (<mailto:y.mehellou@bham.ac.uk>)).

