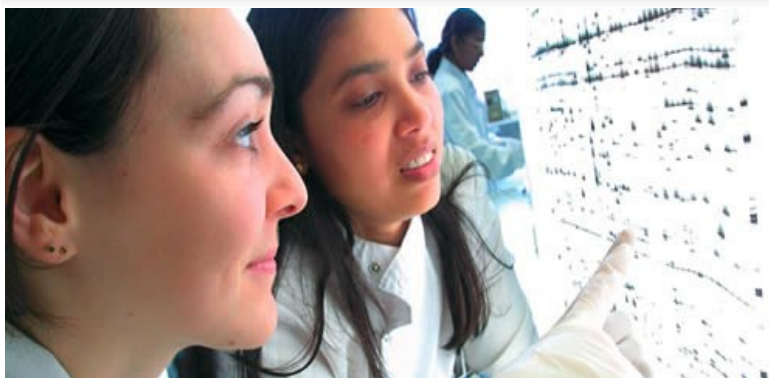


Molecular Mechanistic Toxicology MRes



This programme provides students with a research-orientated training in one of the most rapidly developing areas of toxicology: the use of molecular and cell biology to develop an understanding of chemical toxicity at the cellular and molecular level. You will study within a lively, highly interactive teaching and research environment.

[Study here and find out why the University of Birmingham was awarded The Times and The Sunday Times University of the Year 2013-14 \(http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx\)](http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx)

Course fact file

Type of Course: Combined research and taught

Study Options: Full time

Duration: 1 year

Start date: September

Contact

Biosciences Graduate Research School

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Email: biosciences-phd@bham.ac.uk (<mailto:biosciences-phd@bham.ac.uk>)

[School of Biosciences \(/schools/biosciences/index.aspx\)](/schools/biosciences/index.aspx)

Details

One of the most rapidly developing areas of toxicology is the use of molecular and cell biology to develop an understanding of chemical toxicity at the cellular and molecular level. This is not only of fundamental interest (i.e., understanding the mechanism of action) but it also relates to an increased need for a mechanistic component in chemical risk assessment and development of high throughput screens for chemical toxicity.

The MRes in Molecular Mechanistic Toxicology is a one-year full-time programme that provides students with a research-orientated training in a lively, highly interactive teaching and research environment.

Programme content

The programme is coordinated by the School of Biosciences, which is recognised internationally as a major centre for both teaching and research in Toxicology. Molecular Toxicology is a major component of the School of Biosciences research activities along with interactions with other departments including Chemistry and the Medical School.

Specific areas of active research include:

- Mechanisms of cell toxicity
- Cellular proliferation and differentiation
- Environmental genomics and metabolomics
- Molecular biomarkers of genotoxicity and stress responses
- Non-genotoxic carcinogens and intercellular communication
- Role of environmental and genetic factors in neurological disease

Learning and teaching

Two five-week taught modules are held in conjunction with the taught MSc in Toxicology programme. Training in generic and laboratory research skills is also an important element of the programme. An extended library project provides an opportunity for students to explore and critique a chosen area of toxicological research in detail. The programme also includes a six-month research project, which provides students with an opportunity for further research training and hands-on experience of molecular and cellular biology techniques. Research projects can take place either in academic or industrial institutions and collaborations are encouraged where possible.

Assessment

You will be taught through a combination of lectures, tutorials, coursework, practical classes, student seminars and placement in a research laboratory. The taught component is assessed by a combination of examinations and coursework. The dissertation component is assessed by a thesis and oral presentation.

Skills gained

After completing the course you will have gained a detailed knowledge of the molecular mechanisms of chemical toxicity (e.g. polymorphisms and metabolism, genotoxic and non-genotoxic carcinogens, mechanisms of apoptosis, cDNA microarray and other high throughput screening strategies). You will also be able to critically evaluate and interpret available scientific literature, and effectively present the results of your research to peers using both written reports and oral communications. The programme will help you to develop laboratory skills and enable you to effectively interact in a research laboratory setting.

Careers

Examples of next destinations for graduates of this course include further research training at PhD level and employment as research scientists in an industry/clinical setting.

Why study this course

Toxicology relates to many aspects of our everyday activities, so a career in this field promises to provide a variety of opportunities aimed at improving the standard of life and the environment.

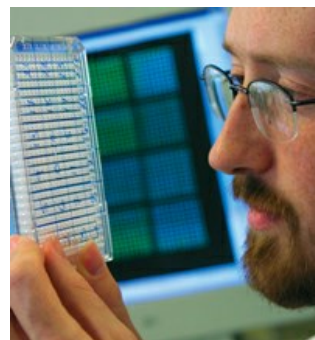
We offer two Masters degrees in Toxicology:

- This Research Masters in Molecular Mechanistic Toxicology
- A taught [MSc in Toxicology \(/postgraduate/courses/taught/biosciences/toxicology.aspx\)](#)

Molecular Toxicology - A multi-disciplinary science

Toxicology is an expanding field with good career prospects. The MRes is a 1-year full time programme (commencing in late September) that provides a research-orientated extension of a molecular biology background into the subject of molecular mechanistic toxicology.

We strive to provide a lively, highly interactive teaching and research environment. Training is provided by members of Academia, Industry, Hospitals and Government Institutes.



[MRes Molecular Mechanistic Toxicology brochure \(PDF 203Kb\) \(/Documents/college-les/biosciences/MResMolecularMechanisticToxicology.pdf\)](#)

Dr Nik Hodges, Course Tutor MRes Molecular Mechanistic Toxicology

"Understanding the molecular bases by which toxic chemicals disrupt cellular function to cause disease such as cancer is an important scientific challenge that can only be addressed using a multidisciplinary approach."

Toxicology Research at Birmingham

The programme is coordinated by the School of Biosciences, which is recognised internationally as a major centre for both teaching and research in toxicology.

Specific areas of active research include:

- Mechanisms of cell toxicity
- Cellular proliferation and differentiation
- Environmental genomics
- Molecular biomarkers of genotoxicity and stress responses.
- Non-genotoxic carcinogens and intercellular communication
- Role of environmental and genetic factors in neurological disease

Fees and funding

Home students - [Standard tuition fees apply \(/postgraduate/dr-fees/tuition.aspx\)](#)

International students - [Standard international tuition fees apply \(/International/students/finance/fees.aspx\)](#) (research) - This programme is in **Fee Band B.**

- Home/EU students £3,996 FT (£1,998 PT)
- International students £16,230 FT only

Scholarships and studentships

Scholarships may be available. International students can often gain funding through overseas research scholarships, Commonwealth scholarships or their home government. [Visit the International scholarships page. \(/International/students/finance/scholarships/index.aspx\)](#)

For further information contact the School directly or get in touch with the Student Funding Office via the online enquiries system at www.studenthelp.bham.ac.uk (<http://www.studenthelp.bham.ac.uk/>).

Entry requirements

At least an upper second-class Honours degree with a substantial component of Molecular Biology

Learn more about [entry requirements \(/postgraduate/requirements-pgt/index.aspx\)](#)

International students

Academic requirements

We accept a range of qualifications, our [country pages \(http://www.birmingham.ac.uk/international/students/country/index.aspx\)](http://www.birmingham.ac.uk/international/students/country/index.aspx) show you what qualifications we accept from your country.

English language requirements

You can satisfy our English language requirements in two ways:

- by holding an **English language qualification** (<http://www.birmingham.ac.uk/students/requirements/requirements-pg/international/index.aspx>) to the level required for an **Engineering or Science** course
- by taking and successfully completing one of our **English courses for international students** (<http://www.birmingham.ac.uk/students/requirements/requirements-pg/international/english-courses.aspx>)

English to IELTS 6.0 (with no less than 5.5 in any band).

How to apply

When clicking on the Apply Now button you will be directed to an application specifically designed for the programme you wish to apply for where you will create an account with the University application system and submit your application and supporting documents online. Further information regarding how to apply online can be found on the **How to apply pages** (<http://www.birmingham.ac.uk/students/courses/postgraduate/apply-pg/index.aspx>)

Apply now (<https://pga.bham.ac.uk/lpages/LESo22.htm>)

Related links

[Toxicology MSc \(/postgraduate/courses/taught/biosciences/toxicology.aspx\)](http://www.birmingham.ac.uk/students/courses/postgraduate/taught/biosciences/toxicology.aspx)

Learning and teaching

What will I learn about on this degree programme?

This programme will provide you with the theoretical knowledge required to understand the mechanisms of chemical toxicity at the cellular and molecular level. This includes an advanced understanding of metabolism of xenobiotics (foreign compounds) and their interaction with cellular targets like proteins, lipids and DNA as well as how toxicity is tested for using new biological techniques such as the "omics". You will also learn how to relate this to the assessment of environmental and pharmaceutical chemical safety. The theoretical knowledge gained in the taught component is linked to research training in state of the art molecular and cellular biology techniques to investigate and understand the mechanisms of chemical toxicity. Students will also receive more generic training in transferable skills such as presentation of scientific data to peers via poster and oral communications, report writing, statistical analysis of biological data, experimental design and critical appraisal of scientific data.

What skills will I gain from this degree programme?

The skills that you will learn from this degree programme include:

- Practical experience of state of the art research techniques in molecular mechanistic toxicology MRes Molecular Mechanistic Toxicology Research Masters in Toxicology
- An understanding of the cellular and molecular basis for chemical toxicity and its implications for chemical safety and risk assessment
- An appreciation of the scientific method and experimental design
- How to critically interpret scientific data and literature
- How to analyse and present your data to your scientific peers through oral and poster communications as well as written reports.

Employability

There is a demand for Toxicologists with molecular biology training in industry and other research organisations. The skills you gain from this course will stand you in good stead to enter research-based careers in the pharmaceutical industry and the medical sciences. You will also have enhanced your opportunities to further your research training by studying for the degree of PhD.

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