



## Postgraduate

# MSc in Pharmacology

### Introduction

The programme provides specialist training in the field of Pharmacology, as well as promoting skills for career and professional development. The MSc in Pharmacology is designed around a strong theoretical education in basic and advanced pharmacology, with practical experience of pharmacological and neuropharmacological techniques in the laboratory. Students will gain insight into receptor theory, molecular pharmacology, neuropharmacology and pharmacokinetics / pharmacodynamics. Physiology will also be taught alongside these elements, facilitating crossover of students qualified in non-biological disciplines to the life sciences. This will allow students to offer skills that cross boundaries, and provide an excellent foundation for studies at PhD level.

### Outline of programme

The course is based around the core Systems Pharmacology module which describes the basics of receptor theory, second messenger actions and autonomic pharmacology. Understanding of fundamental aspects of pharmacology of neuromuscular junction and synaptic function are also delivered via the physiological pharmacology module and the actions of drugs and the nature of receptors are then considered at the molecular level, with a focus on the exciting and important field of neuropharmacology. The drug discovery module gives an overview of the pharmaceutical industry; an introduction to receptors and drug action and chemical and biological aspects of evaluation and development of new compounds

### Modules include:

Systems Pharmacology - autonomic pharmacology  
Systems pharmacology - neuropharmacology  
Drug Discovery  
Research Methods  
Physiological Pharmacology  
Advanced Pharmacology

The supervised research project will last for approximately four months, and will be at the level expected for first year PhD study. Topics might include, for example, the actions of cannabinoids in cortical synaptic plasticity.

### Module Information

#### Drug Discovery

The aim of the module is to provide an overview of the drug discovery process from target to market. This module includes: an overview of the pharmaceutical industry; an introduction to receptors and drug action; biological evaluation of new compounds; drugs from nature; medicinal natural products - a biosynthetic approach; lead discovery and lead optimization; combinatorial chemistry and high throughput synthesis; drug chirality and its pharmacological consequences; prodrugs; absorption, distribution, metabolism, elimination and clearance; the role of toxicology in drug development; drug design and physicochemical properties; drug development; clinical trials; future trends – the “-omics” and case studies in drug design and drug discovery.

#### Physiological Pharmacology

This module covers the basic physiology of neuromuscular junction, ANS and CNS synapses, the basis of neurotransmitter release and action potentials. Other topics include ligand-gated ion channels, pharmacological techniques and basic pharmacodynamics. This module aims to provide a basis for understanding the modules that follow below.

#### Systems Pharmacology 1 – basic and autonomic pharmacology

The aim of this module is to provide a description of receptor theory, second messenger and G-protein action, and to describe the pharmacology of the autonomic nervous system, the core of any pharmacological understanding of ligand-receptor interactions.

#### Systems Pharmacology 2 – neuropharmacology

This module covers more advanced topics such as glutamate and GABA receptor pharmacology, central neurotransmission, and expands the material covered into areas of CNS function and dysfunction including, for example, the molecular pharmacology of memory formation, anxiety and depression.

## Advanced Pharmacology

This module aims to present cutting edge topics, including, cannabinoid receptor pharmacology, further molecular aspects of memory formation at CNS synapses, and advanced aspects of GABA function. Material is presented by active researchers, in 2-hour seminars.

## Research Methods 1: Professional Development

The professional skills taught in this module will equip you with general and transferable talents with broad application both within and outside of academia. You will also become aware of professional issues regarding research funding and exploitation and the importance of ethical codes for guiding best practice in research.

## Research Methods 2: Communication Skills

This module includes the following: critical analysis of published work, reviewing papers; writing abstracts, writing research papers, preparing poster presentations and oral presentation skills.

## Research Project

The research project involves experiential learning with the completion of a comprehensive literature review appropriate to the project. This involves the preparation of a detailed project plan including resourcing and costing of materials and appreciation of experimental design, power calculations where appropriate for study design, ethical and logistic considerations. In addition, an individual research project that includes practical work that involves data production, processing and analysis. The preparation of a detailed final project report (mini-thesis) and the preparation of a poster to illustrate the main findings from the project to an audience of fellow students and staff. The research project forms the primary practical component of this degree, and practical classes are not offered.

## Assessment

This is in the form of written examinations, coursework essays and the project report/poster. Examinations usually take place once yearly in summer. Repeat examinations are offered in the summer of the subsequent academic year.

## Entry requirements

This course is open to suitably qualified international and UK-based graduates (a good UK Hons Degree in Pharmacy, Pharmaceutical Science, Physiology, Physical Science, Biochemistry, Biotechnology, Chemistry, Chemical Engineering, Genetics, Materials Science, Medicine or a related field from a recognised university; (minimum of a lower second class or an overseas degree recognised by Aston University, plus two references). Students whose first language is not English must demonstrate a satisfactory command of written and spoken English before enrolment on the programme (demonstrated by an IELTS score of 6.5 or higher overall, but with no score below 6.0).

There is no specific application deadline. Once the course becomes full, we cannot consider additional applicants. We recommend applicants to apply before the end of March 2009.

## Fee & financial support

Please refer to our web site for the current fee and financial support information.

## For further information please contact

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