NUI Galway
OÉ Gaillimh

Pharmacology & Toxicology

Why study this module?

You should take this module if you are interested in the pharmacodynamics, pharmacokenetics and toxicity of drugs currently used to treat major human diseases. The pre-clinic and regulatory hurdles that must be overcome when developing novel therapeutics are also explained.

Module content

This module provides an introduction to Pharmacology, with an emphasis on the discovery and development of drugs. Topics include an overview of the various molecular targets for drugs and dose-response relationships, pharmacokinetics (drug absorption, distribution, metabolism and elimination), the discovery and evaluation of drugs both from a therapeutic and harmful perspective.

Learning outcomes

On completion of this module you will be able to:

- Identify the sources, names and classification of drugs, their principal targets and nature of interactions, and describe ways in which comparisons are made in their pharmacological properties
- Describe the mechanisms by which drugs enter, travel around and are metabolised and eliminated from the body, and identify major sources of variation in these responses between subjects
- Describe how drug efficacy is evaluated preclinically and clinically, the role of the regulatory agencies in this process and the major challenges faced in the interpretation of data derived from such investigations
- Describe the various safety considerations associated with drug use, and the major mechanisms identified for explaining the harmful effects of drugs, and how such effects are evaluated preclinically and clinically

Who is the target audience?

Professionals working in the diagnostics, medical device and pharmaceutical sectors, or those involved in drug dispensing or regulatory affairs. Individuals who wish to learn how drugs affect the human body will also be fascinated by this module.

Module facts

Course level: Level 9

Module credit: 5 ECTS. Gain transcript or use towards PG Cert/PG Dip/MSc qualification in Biomedical Science

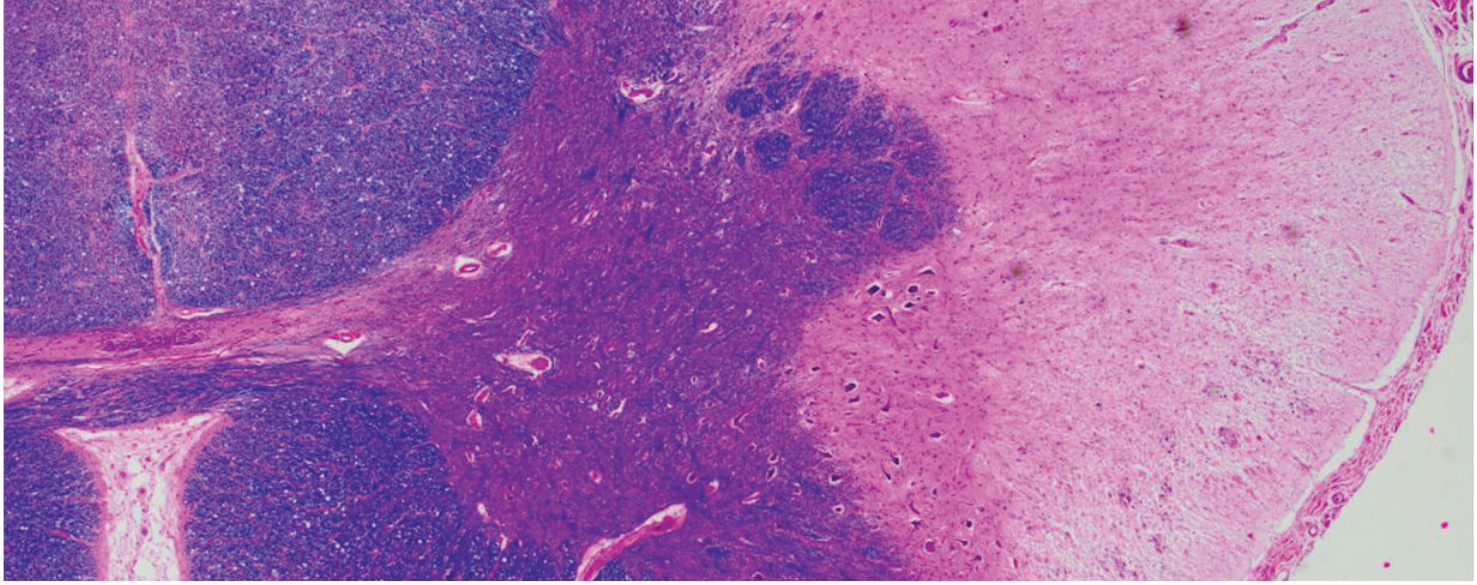
Duration: Over one semester

Entry Requirements: Please refer to the application section of the programme brochure

Fees: €1,000

Applying: www.nuigalway.ie/apply

Closing date: 2 – 8 weeks prior to module start date



Module topics

Pharmacodynamics

- Sources, names and classification of drugs
- Principal drug targets, and the nature drug interaction with these targets
- How drugs produce their biochemical and physiological effects
- How drugs are compared and contrasted to each other

Pharmacokinetics

- Mechanisms by which drugs enter the body
- Ways in which drugs travel around the body
- Mechanisms involved in drug metabolism and elimination
- Major sources of variation in these responses between subjects

Efficacy Evaluation

- Role of the regulatory agencies in the drug development process
- Role that preclinical efficacy investigations play in drug development
- How drug effects are evaluated in clinical trials
- Major challenges faced in the interpretation of clinical data

Safety Evaluation

- Safety considerations associated with drug use
- Major mechanisms identified for explaining the harmful effects of drugs
- Ways in which drug toxicity can be evaluated preclinically
- Principal harmful effects that drugs can have clinically

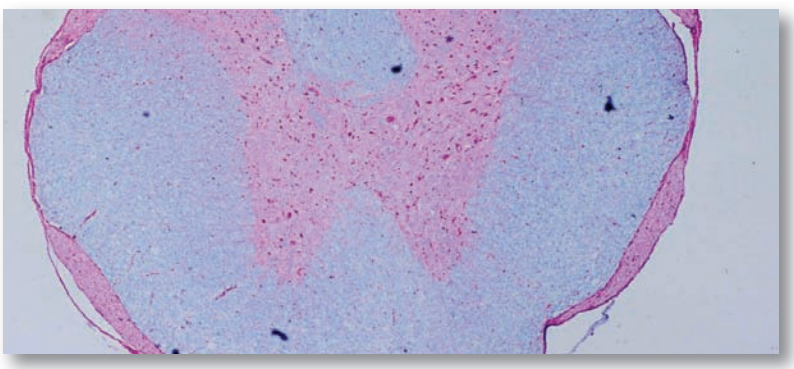
Student testimonial

Conor Greaney

Current position:

Research & Development Engineer with Boston Scientific, Galway.

"I found the Applied Pharmacology and Toxicology module very interesting and having not studied this subject area previously, I found the module was delivered in a very structured and clear manner that gave an excellent and thorough introduction to how drugs work, how the body processes different drug types, the efficacy and safety evaluation of drugs. The course gave an excellent insight into the steps and challenges faced by industry from drug discovery and molecular targets, to drug development and safety evaluation of a drug, right through to market release and post market surveillance. The continuous assessment nature of the course keeps you engaged on each topic throughout the module as it progressed, and students get to apply what is learned to their drug of interest through the course assignment. I find that the nature of the content of this module means that it can be applied to any drug of interest whether working in the pharmaceutical industry or any other industry type that uses pharmaceutical components."



Module Director

Prof. John Kelly

Prof. John Kelly, who is based in the discipline of Pharmacology and Therapeutics, delivers this module. John has a BSc in Applied Biology from the University of East London and a PhD in Neuropharmacology (NUI Galway). He has spent 25 years in pharmacological and toxicological research, starting with 8 years in a pharmaceutical company in the UK. After obtaining a PhD. John worked initially as a postdoctoral researcher, and then as a lecturer within Pharmacology and Therapeutics at NUI Galway. Current areas of research include the mechanisms of action of antidepressants using preclinical models, developing alternatives to laboratory animals for acute toxicity assessment, and the effects of MDMA ("Ecstasy") on neurochemical, behavioural and immune parameters. Prof. Kelly received the NUI Galway President's Award for Teaching Excellence in 2011, and a DSc for published work in 2013, awarded by NUI Galway.

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