

Module Details	
Module Title	Molecular Mechanisms of Toxicity
Module Code	INC7009-B
Academic Year	2020/1
Credits	20
School	School of Pharmacy and Medical Sciences
Subject Area	Cancer Therapeutics
FHEQ Level	FHEQ Level 7
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Laboratories	5
Tutorials	8
Lectures	21
Directed Study	166

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2
BDA	University of Bradford / Semester 3

Module Aims

To develop a critical evaluative understanding of the molecular mechanism underlying cellular toxicity.

Emphasis is placed on emerging concepts that reflect the changing nature of modern drug development. The module will address the mechanisms responsible for drug target toxicity and the evolution of new preclinical strategies to identify and predict such mechanisms.

The module is structured as a combination of lectures, tutorials, student-led seminars and laboratory investigation, plus student directed learning.

The student led seminars consist of the preparation and delivery of a drug profile presentation, where students individually review and present a selected drug profile with an emphasis on toxicity and in vitro screening methods as an alternative to in vivo toxicology. The laboratory investigation includes the preparation of a detailed experimental report covering methods, data collection and data analysis and interpretation.

The acquired knowledge will be assessed by coursework evaluation and examination at the end of the semester.

Outline Syllabus

This module will cover the molecular mechanisms underlying the potential toxicities of new drugs under development. Topics to be covered include chemical carcinogenesis, genotoxic and non-genotoxic mechanisms, receptor mediated toxicity including biological mimicry, direct and indirect toxicity, regenerative hyperplasia as a toxicological mechanism, molecular mechanisms of cell death and hyperproliferation, sex and species differences. The module will also cover methodology for identifying molecular mechanisms including toxicogenomics (incl. toxicant fingerprinting), toxicoproteomics (incl. global proteomic change and signalling pathway specific changes) and the importance of extrapolation of risk data from rodent studies to humans. An important area in safety pharmacology is the development of alternative strategies to preclinical in vivo studies for identifying drug toxicity and or predicting drug safety. As such this module will address alternatives to animal testing, the advent of non-invasive imaging for toxicology evaluation and predictive computational models (incl. in silico toxicity prediction). Students will also extend their literature searching and written communication skills through the preparation of a report on molecular mechanisms of toxicity and an oral communication on alternatives to animal testing through presentation of a seminar.

Learning Outcomes	
Outcome Number	Description
1	Critically evaluate the mechanisms underlying toxicity in the context of drug development.
10	Develop a strategy to present a discussion of a research paper or research theme.
11	Develop generic literature skills for life-long learning (literature & databases).
2	Understand the different cellular mechanisms of toxicity and their relevance to drug development
3	Critically evaluate methods and techniques for predicting potential toxicities
4	Describe toxicological screening tools as alternatives to in vivo drug screening
5	Understand the requirements for regulatory body approval
6	Critically evaluate and interpret the molecular mechanisms underlying toxicity
7	Describe current and new methods for identifying drug toxicity and their underlying molecular basis
8	Understand methodology for identifying molecular mechanisms of toxicity and discuss strategies for predicting toxicity
9	Work as part of a team, interpret data, plan experimental work and work to deadlines

Learning, Teaching and Assessment Strategy
N/A

Mode of Assessment				
Type	Method	Description	Length	Weighting
Summative	Examination - Closed Book	One 2-hour examination (two essays to be answered from a choice of five)	2 hour	50%
Summative	Coursework	One oral presentation of drug profile and alternative screening methodologies	N/A	25%
Summative	Coursework	A molecular mechanism of apoptosis written report	N/A	25%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.

