

PHAR S8017: Physiology & Pharmacology

Module Details	
Module Code:	PHAR S8017
Full Title:	Physiology & Pharmacology APPROVED
Valid From::	Semester 1 - 2018/19 (September 2018)
Language of Instruction:	English
Duration:	1 Semester
Credits::	7.5
Module Owner::	Mark Hollywood
Departments:	Unknown
Module Description:	<p>The aims of this module are;</p> <ul style="list-style-type: none">•To provide an overview of the physiological control of selected body systems.•To examine how these body systems are affected by drugs.•To show how drug activity depends upon the route of administration, absorption, distribution, metabolism and elimination of the drug. <p>The aims of this module are;</p> <ul style="list-style-type: none">•To provide an overview of the physiological control of selected body systems.•To examine how these body systems are affected by drugs.

Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	Module Learning Outcome Description
MLO1	Summarise the fundamental principles of pharmacodynamics and pharmacokinetics, explaining how plasma drug concentration is affected by the processes of absorption, distribution, metabolism and excretion.
MLO2	Construct concentration-response curves and interpret concentration-response data of selected agonists and antagonists through a combination of in-vitro and in-silico experimentation.
MLO3	Describe the cellular basis of drug action.
MLO4	Examine the process of autonomic neurotransmission and drugs which affect it.
MLO5	Discuss the physiology of selected body systems and how these are affected by clinically relevant drugs.
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named DkIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	

Module Indicative Content
<p>• Physiological control A review of cellular physiology and signalling mechanisms: intracellular Ca²⁺, ion channels and action potentials. The autonomic nervous system: structure and function, parasympathetic nervous system, sympathetic nervous system. Cholinergic neurotransmission: synthesis, storage, release and effect of acetylcholine at autonomic synapses, parasympathetic junctions and the neuromuscular junction. Adrenergic neurotransmission: synthesis, storage, release and actions of noradrenaline at sympathetic junctions.</p>
<p>• Basic pharmacological principles Targets of drug action: ion channels, receptors, transporters and enzymes. Receptor pharmacology: agonists & antagonists, affinity vs efficacy and concentration-response curves. Receptor superfamilies and signal transduction mechanisms. Pharmacokinetics: the routes of administration, absorption, distribution, metabolism and elimination of drugs. The effects of lipid solubility, ionisation and pH partition upon drug accumulation</p>
<p>• Drugs and the body An overview of the physiology and pharmacology of the renal system, cardiovascular system and nervous system. Lectures will include an examination of how clinically relevant drugs interact with each system.</p>
<p>Practical work: Practical classes will include a combination of lab-based experiments and computer-simulations of classical pharmacology experiments. Computer based simulations of the effects of agonists and antagonists acting upon the isolated guinea pig ileum will be provided. These practicals provide an insight into the regulation of contractility of the gastrointestinal tract and the generation of concentration-response curves in the presence of reversible and non-reversible antagonists. Computer based simulations will also be used to assess the effects of different routes of administration, changing rates of absorption, altering patterns of drugs distribution and altering elimination rate constants upon the time course of plasma drug concentration. More traditional, laboratory based practicals will utilize isometric tension recordings and permit students to gain hands on experience working with live tissues and performing pharmacological experiments. These practical's investigate the effect of autonomic receptor agonists on spontaneous contractile activity of smooth muscle and investigate how these are affected by a range of ion channel modulators and selective receptor antagonists.</p>

Module Assessment	
Assessment Breakdown	%
Course Work	10.00%
Practical	40.00%
Final Examination	50.00%
Module Special Regulation	

Assessments

Full Time On Campus			
Course Work			
Assessment Type	Presentation	% of Total Mark	10
Marks Out Of	0	Pass Mark	0
Timing	End-of-Semester	Learning Outcome	1,3,5
Duration in minutes	0		
Assessment Description Students will be assigned to groups of four and will deliver an oral presentation describing clinical conditions that affect the body and the pharmacological basis of their therapeutic treatment.			
No Project			
Practical			
Assessment Type	Practical/Skills Evaluation	% of Total Mark	40
Marks Out Of	100	Pass Mark	40
Timing	n/a	Learning Outcome	1,2,3,4,5
Duration in minutes	120		
Assessment Description Students will complete a range of practical classes, including computer based simulation experiments, in-vitro isometric tension recordings and blood pressure monitoring from human volunteers. Students will be supplied with a practical manual with details of each experimental procedure. Marks will be awarded for successful completion of the manual.			
Final Examination			
Assessment Type	Formal Exam	% of Total Mark	50
Marks Out Of	0	Pass Mark	0
Timing	End-of-Semester	Learning Outcome	1,2,3,4,5
Duration in minutes	0		
Assessment Description End-of-Semester Final Examination			
Reassessment Requirement			
Reattendance <i>The assessment of this module is inextricably linked to the delivery. Therefore reassessment on this module will require the student to reattend (i.e. retake) the module in its entirety.</i>			
Reassessment Description If students fail the exam or coursework, they must repeat these. If they fail the practical classes, they must repeat attend.			

Module Workload

Workload: Full Time On Campus

<i>Workload Type</i>	<i>Contact Type</i>	<i>Workload Description</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>	<i>Hours</i>
Lecture	Contact	No Description	Every Week	2.00	2
Practical	Contact	No Description	Every Week	2.00	2
Tutorial	Contact	No Description	Every Week	1.00	1
Independent Study	Non Contact	Library study, Lab write up, CA preparation, exam revision	Every Week	4.00	4
				Total Weekly Learner Workload	9.00
				Total Weekly Contact Hours	5.00

This module has no Part Time On Campus workload.

Module Resources

Recommended Book Resources

Rang, Dale, Ritter & Moore. (2015), Rang and Dales Pharmacology, 8th. Churchill Livingstone, Elsevier.
Golan DE, Tashjian AH, Armstrong EG, Armstrong AW. (2016), Principles of Pharmacology, 4th. Lippincott, Williams and Wilkins, USA.
Guyton & Hall. (2016), A Textbook of Medical Physiology, 13th. Elsevier, Saunders, USA.

This module does not have any article/paper resources

Other Resources

Trends in Pharmacological Sciences,
<http://www.sciencedirect.com/science/journal/01656147>
British Pharmacological Society,
<http://www.bps.ac.uk/site/cms/contentChapterView.asp?chapter=1>
Pubmed,
<http://www.ncbi.nlm.nih.gov/>
Medline,
<http://www.nlm.nih.gov/medlineplus/>
Biotechniques,
<http://www.biotechniques.com/>
The Scientist,
<http://www.the-scientist.com/>
Link, Library Catalogue,
<https://www.dkit.ie/library>