BIOCHEMISTRY - RECEPTORS AND ENERGY METABOLISM - 2024/5

Module code: BMS3052

Module Overview

This module will address four broad topics, namely Integration of Metabolism, Nuclear Receptors, Bioenergetics and Cell Signaling.

Module provider

School of Biosciences

Module Leader

LYMPANY Penny (Biosciences)

Number of Credits: 15

ECTS Credits: 7.5

Framework: FHEQ Level 6

Module cap (Maximum number of students): N/A

Overall student workload

Workshop Hours: 8

Independent Learning Hours: 52

Lecture Hours: 40

Guided Learning: 10

Captured Content: 40

Module Availability

Semester 1

Prerequisites / Co-requisites

Biochemistry: The molecules of life (BMS1049) or Biochemistry: Understanding the chemistry of life (BMS1054), and Biochemistry: The conceptual overview (BMS1041) and Biochemistry: Enzymes and metabolism (BMS2035) or Experimental Biology (BMS2083)

Module content

- Overview of metabolic pathways and their integration.
- General properties of nuclear receptors.
- Peroxisome Proliferator Activated Receptors (PPAR's): Structure and function.
- Sterol Regulatory Element Binding protein (SREBP): Structure and function.
- Overview of plasma membrane receptors and their downstream actions.
- G-protein coupled receptors (e.g. glucagon receptor).
- Protein kinase receptors (e.g. insulin).
- Link receptor action to physiological conditions such as insulin resistance and cancer.
- Critical thinking and essay-writing workshops.

Assessment pattern

Assessment type	Unit of assessment	Weighting
Coursework	ESSAY 1	50
Coursework	ESSAY 2	50

Alternative Assessment

Not Applicable

Assessment Strategy

The assessment strategy is designed to provide students with the opportunity to demonstrate critical understanding of the taught topics linked to independent extra reading

Thus, the assessment strategy for this module consists of:

- Coursework essay 1: 50% weighting; 1,000-word upper limit (Dr Alfred Thumser)
- Coursework essay 2: 50% weighting; 1,000-word upper limit (Dr Surinder Soond)

Formative feedback & advice will be provided through:

- In-class & online discussions
- In-class polls, e.g. PollEverywhere or Kahoot
- An Assessments Brief
- Coursework guidance
- Essay-focused workshops
- One-to-one advice opportunities

Summative feedback:

- Feedback on essays (written feedback on essay and one-to-one feedback, as requested)

Module aims

- Provide an integrative, whole-body perspective on metabolism and its regulation.
- Provide an understanding of the molecular mechanisms which underlie metabolic regulation.
- Provide a comprehensive analysis of the processes involved in the generation of metabolic energy.
- Explain in detail the intracellular signaling pathways activated by the plasma membrane and intracellular receptors
- Provide detailed information about the nature and the role of the second messengers involved in intracellular signaling pathways
- ¿ Discuss the importance of cellular signaling pathways in regulating gene transcription in health and disease.

Learning outcomes

		Attributes Developed
001	Demonstrate a sound knowledge of the integration of metabolic pathways	KC
002	Understand the key role of nuclear receptors in the control of metabolism, with specific reference to lipids and glucose	KC
003	Understand the similarities and differences between PPARalpha, PPAR beta/delta and PPARgamma, and SREBP	KC
004	Identify how plasma membrane and nuclear receptors control cellular metabolism and function	KC
005	Understand energy metabolism as a biochemical process by which cells obtain and utilize free energy to perform their functions	KC
006	Identify the role of intracellular signaling pathways activated/initiated by cell surface or intracellular receptors in cell function and response	KC
007	Understand the key intracellular signaling pathways regulated by receptors and second messengers under physiological and pathological conditions	KC
008	8. Demonstrate independent learning and relevant further reading, thus further developing scientific and critical thinking skills	KPT

Attributes Developed

C - Cognitive/analytical

K - Subject knowledge

T - Transferable skills

P - Professional/Practical skills

Methods of Teaching / Learning

- In-class lectures
- In-class workshops: Critical thinking & essay-writing skills
- In-class and online discussions
- Advised extra reading, including scientific papers and reviews
- One-to-one advice opportunities

Indicated Lecture Hours (which may also include seminars, tutorials, workshops and other contact time) are approximate and may include in-class tests where one or more of these are an assessment on the module. In-class tests are scheduled/organised separately to taught content and will be published on to student personal timetables, where they apply to taken modules, as soon as they are finalised by central administration. This will usually be after the initial publication of the teaching timetable for the relevant semester.

Reading list

https://readinglists.surrey.ac.uk
Upon accessing the reading list, please search for the module using the module code: BMS3052

Other information

Resourcefulness & Resilience: Students will be provided with guidance, both direct (wellbeing & resilience workshop) and indirect (further workshops & tutorials), to further develop their resiliency and reflective skills (Learning Outcome 8).

Digital capabilities: Students will enhance their digital literacy skills throughout the module, building on their learning at levels 4 & 5 (Learning Outcome 8).

Employability: Students will indirectly gain employability skills through the further development and fine-tuning of their critical thinking, literacy and communication skills, building on their learning at levels 4 & 5 (Learning Outcome 8).

Programmes this module appears in

Programme	Semester	Classification	Qualifying conditions
Biochemistry BSc (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Biochemistry MSci (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Biological Sciences (Cellular and Molecular Sciences) BSc (Hons)	1	Optional	A weighted aggregate mark of 40% is required to pass the module
Biological Sciences BSc (Hons)	1	Optional	A weighted aggregate mark of 40% is required to pass the module
Biomedical Science BSc (Hons)	1	Optional	A weighted aggregate mark of 40% is required to pass the module
Biomedical Science MSci (Hons)	1	Optional	A weighted aggregate mark of 40% is required to pass the module
Veterinary Biosciences BSc (Hons)	1	Optional	A weighted aggregate mark of 40% is required to pass the module