



Module Specification

Molecular Medicine

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Part 1: Information

Module title: Molecular Medicine

Module code: USSKCG-15-3

Level: Level 6

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Applied Sciences

Module type: Standard

Pre-requisites: Genetics 2021-22, Molecular Biotechnology 2021-22

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Pre-requisites: Students must take Molecular Biotechnology (USSKAM-30-2) OR Genetics (USSKFQ-15-2).

Globally, societies are presented with numerous medical challenges in understanding the causes of, diagnosing and treating existing and newly emerging diseases. Clearly there are numerous difficult problems which require effective

solutions, many of which are provided by the application of biotechnology. The last 60 years has seen a truly astonishing growth in our understanding of the science that underpins biological processes. The discovery of DNA and more importantly an understanding of how to manipulate gene expression in bacteria and higher organisms have provided the basis for a medical biotechnology revolution that now impinges on all walks of life. This module in “Molecular Medicine” will introduce you to up to date biotechnological approaches and solutions that endeavour to overcome many of the medical issues faced by societies across the world.

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: In this module you will examine the use of heterologous gene expression systems which use organisms including bacteria, yeast, plants, cell cultures and higher animals both for the study of gene function and the study of potential disease treatments and for the production of medically important pharmaceuticals and replacement transplantation organs in an industrial setting. You will learn about a range of modern molecular analytical and diagnostic approaches for the determination of the causes and progression of diseases and subsequently examine gene therapy approaches which employ gene editing and cell targeted viral transformation systems for the treatment of inherited genetic disorders. You will examine the ethical use of bio-prospecting technologies and the molecular techniques employed along with the associated phylogenetic approaches for the discovery of novel therapeutic molecules and the use of targeted protein engineering technologies which aim to alter and optimise protein function and facilitate the design of novel drugs. Finally, you will examine the use of bio-sensing technologies and the use of recombinant protein technologies therein for both the detection of diseases and monitoring treatment efficacy.

Ultimately, you should be able to understand the molecular biotechnological research, clinical and industrial scale up phases which result in the synthesis of treatments for a wide range of medical diseases and how the ability of the processes employed to treat those diseases is monitored and evaluated.

Part 3: Teaching and learning methods

Teaching and learning methods: Core graduate skills will be evidenced in this L3 module. Written and oral communication skills and dissemination of critically analysed learned material in a professional manner to an audience will be assessed both in the coursework and case study presentation. The written and presented case study will give students the opportunity to evidence their ability to use digital machinery and to be innovative, forward looking and global in their perspective while presenting themselves in an emotionally intelligent manner.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Review the scientific literature relevant to the biotechnology that underpins molecular medicine and demonstrate an written understanding of the fundamentals of this subject area

MO2 Critically appraise the potential of the biotechnology sector to provide solutions in medical research, disease diagnosis, prevention, and therapy and in deriving commercial medically useful products

MO3 Discuss the molecular techniques associated with the generation of transgenic microbes and higher organisms and their applications in the medical field

MO4 Discuss the application of biotechnology within a biodiversity setting and understand how this may lead to the discovery of novel treatments for diseases

MO5 Discuss the use of bio-sensing technologies within a medical context and critically evaluate the techniques employed

MO6 Orally present a comprehensive understanding of the subject area contained within the module and answer relevant in depth questions.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/usskcg-15-3.html) via the following link <https://uwe.rl.talis.com/modules/usskcg-15-3.html>

Part 4: Assessment

Assessment strategy: Summative assessment for this module will be provided using a number of approaches. The nature of the programme to which this level 3 module contributes requires a measure of their acquisition of oral presentation skills of critically discussed and analysed data and information obtained from researching the literature.

The ability of the students to write scientifically, independently research the literature and analyse published data will be assessed under component B in the form of a 2000 word case study report that incorporates the use of and extends upon the majority of the taught material within the module. Students will be given a choice of a range of appropriate topics to research in depth beyond the lecture material and to critically present this in a structured format such that they can demonstrate a clear understanding and application of the majority of the material within the module. Final summative assessment under component A1 will take the form of a 25 min short oral presentation including questioned examination (15 min. presentation, 10 min. questions) of the case study in component B and will be designed to test the ability of the students to present and critically discuss the range of topics in the module within a wider context and to highlight, thinking, further interest and independent research and reading beyond the taught material. Presentations will be marked with emphasis on both the ability of students to present orally and to demonstrate a clear knowledge and understanding of the application of the material taught within the module.

Assessment components:

Presentation - Component A (First Sit)

Description: Oral Presentation/ Question-Answer Session (25 mins)

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5, MO6

Case Study - Component B (First Sit)

Description: Extended case study (2000 words)

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Presentation - Component A (Resit)

Description: Oral Presentation/ Question-Answer Session (25 mins)

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Case Study - Component B (Resit)

Description: Extended case study (2000 words)

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biological Sciences [Sep][FT][Frenchay][3yrs] BSc (Hons) 2019-20

Biological Sciences [Sep][FT][Frenchay][4yrs] MSci 2019-20

Biological Sciences [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19

Biological Sciences [Sep][SW][Frenchay][5yrs] MSci 2018-19

Biological Sciences {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2018-19

Biological Sciences {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19