



## **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:** 2023-24

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Health & Applied Sciences

**Department:** HAS Dept of Applied Sciences

**Partner institutions:** None

**Field:** Applied Sciences

**Module type:** Module

**Pre-requisites:** Genetics 2023-24, Molecular Biotechnology 2023-24

**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 one out of 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 Assessment Task 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 Assessment task 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 Task 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 tasks:**

#### **Presentation (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** (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** (Resit)

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** (Resit)

Description: Extended case study (2000 words)

Weighting: 40 %

Final assessment: No

Group work: No

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

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Biological Sciences [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Biological Sciences [Sep][FT][Frenchay][4yrs] MSci 2021-22

Biological Sciences [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Biological Sciences [Sep][SW][Frenchay][5yrs] MSci 2020-21

Biological Sciences {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2020-21

Biological Sciences {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Biological Sciences {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20

Biological Sciences {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2019-20