

| Module Details | |
|----------------|-------------------------------------|
| Module Title | Molecular and Cell Biology |
| Module Code | BIS7020-B |
| Academic Year | 2024/5 |
| Credits | 20 |
| School | School of Chemistry and Biosciences |
| FHEQ Level | FHEQ Level 7 |

| Contact Hours | |
|--------------------------------|-------|
| Type | Hours |
| Directed Study | 155 |
| Lectures | 27 |
| Practical Classes or Workshops | 15 |
| Tutorials | 3 |

| Availability | |
|--------------|-------------------------------------|
| Occurrence | Location / Period |
| BDA | University of Bradford / Semester 1 |

| Module Aims |
|--|
| To develop a detailed understanding and a comprehensive knowledge of: <ol style="list-style-type: none"> 1. Current concepts in molecular biology 2. Cellular organisation and functions 3. Concept of stem cells and their differentiating progeny |

Outline Syllabus

Structure of prokaryotic and eukaryotic genomes.

Prokaryotic and eukaryotic DNA replication, repair and recombination. Prokaryotic and eukaryotic transcription,

RNA polymerases, gene regulatory elements, transcription factors and co-factors. Chromatin structural organisation and its role in control of gene transcription.

RNA processing and transport: capping, splicing, poly-adenylation, stability and transport. Prokaryotic and eukaryotic translation: initiation, aminoacylation, elongation by ribosomes, and the genetic code. Non-coding RNAs, regulatory roles of miRNAs and long non-coding RNAs. Cell cycle regulation, cyclin, cyclin-dependent kinases (CDK), and CDK inhibitors. Cellular senescence, apoptosis. Growth factor signalling and regulation of signalling pathways. Stem cells: embryonic and adult stem cells, pluripotency, stem cell niche, cell differentiation.

Learning Outcomes

| Outcome Number | Description |
|----------------|--|
| 01 | Systematically understand and be able to critically analyse and implement in their research the recent advances in molecular mechanisms that control DNA replication, recombination and repair, gene expression, RNA and protein regulatory functions. |
| 02 | Systematically understand and be able to critically analyse and implement in the research current knowledge of regulatory mechanisms controlling fundamental cellular events, such as cell growth, proliferation, migration, senescence, apoptosis, cell communication and signalling. |
| 03 | Critically analyse and discuss the principles of mammalian stem cell biology in relation to development, tissue homeostasis and regeneration. |
| 04 | Demonstrate oral and written scientific communication skills. |
| 05 | Analyse primary literature and critically appraise the major topics in molecular and cell biology. |
| 06 | Demonstrate personal responsibility for self-directed learning and time management. |

Learning, Teaching and Assessment Strategy

The majority of the curriculum that develops the knowledge and understanding required in this module is delivered in lectures, and then reinforced in workshops. Further development of knowledge and understanding, alongside the ability to undertake critical analysis of the relevant information, problem solving and scientific writing, is achieved through practical sessions and workshops. Significant time will be allocated for directed study. The workshop exercises and practical classes will require students to work under pressure, meet deadlines and demonstrate advanced understanding of the underlying principles essential to molecular biology.

Mode of Assessment

| Type | Method | Description | Weighting |
|-----------|----------------------|---|-----------|
| Summative | Presentation | Critical interpretation presentation | 50% |
| Summative | Coursework - Written | Online assessment of major topics in molecular and cell biology | 50% |

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.

© University of Bradford 2024

<https://bradford.ac.uk>