LF206-15 Molecular Cell Biology

26/27

Department
Life Sciences
Level
Undergraduate Level 2
Module leader
Robert Spooner
Credit value
15
Module duration
10 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

The module aims to achieve a more in depth understanding of the basics of molecular biology. At the end, you should understand the organisation and complexity of the sequence constitution of chromosomes in both Pro- and Eukaryotes, and understand how genes are controlled by building on the basics learnt in LF130 Molecular Cell Biology on the nature of transcriptional control. You will be able to place this understanding into the context of chromatin remodelling, and will be introduced into the molecular biology of epigenetics. You will gain an understanding of the mechanism of other layers of post-transcriptional/translational/post-translational control based on modern molecular methods and how they are used to study modern biological problems.

Understanding the biology of eukaryotic organisms requires knowledge of their organisation and operation at the cellular level. An appreciation of the means by which cells perform their many functions is a prerequisite for detailed study of the underlying biochemistry. This module does not cover the entire range of subjects that could be included under the heading of Cell Biology but concentrates on key areas to illustrate principles and to allow you access to the wider range of information available in modern texts.

Module aims

- To achieve a thorough understanding of the structure and sequence content of both

Prokaryotes and Eukaryotes.
- To understand the control of gene expression at multiple layers - from chromosomal context, to expression, to modifications of the product.
- To understand the most recent methodology in the field and the context in which they are used.
  In the associated tutorials, which are largely based around original research papers, you should gain an appreciation of how scientific discoveries are made, and the general principles of scientific research. It will also allow you to follow in detail an investigation of the activity of a particular gene product using recombinant DNA technology.

You should gain a detailed understanding of the molecular biology which underlies the fundamental cellular processes of:

- The cytoskeleton in cellular structure, function and motility
- Mechanisms controlling genome stability
- Protein processing in secretory pathway organelles
- Cell death programs in eukaryotic cells

You are also expected to gain a clear appreciation of the principles that underpin current understanding of these processes and also of the experimental approaches by which these have been elucidated.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Prokaryote and Eukaryotic genomes
Transcription and Post-transcriptional gene control
Advanced molecular techniques.
Translation and translational control.
Post-translational modifications and events.
Cytoskeletal components and intracellular transport
Cell death (necrosis and apoptosis)

Learning outcomes

By the end of the module, students should be able to:

- Understand the organisation and complexity of the sequence constitution of chromosomes in both Prokaryotes and Eukaryotes.
- Understand how genes are controlled by building on the basics learnt in LF130 on the nature of transcriptional control
- Place this understanding into the context of chromatin remodelling, and will be introduced into the molecular biology of epigenetics
- Gain an understanding of the mechanism of other layers of post-transcriptional/translational/post-translational control

- Be introduced into modern molecular methods and how they are used to study modern biological problems.
- Gain a detailed understanding of the biology that underlies the fundamental cellular processes of such as the control of cellular activities, the major forms of the cytoskeleton and the process of cell death.
- The principles that underpin the current understanding of these processes and their impact on development and disease form the basis of this module.

Indicative reading list

Reading lists can be found in Talis

Research element

30% of the module marks will involve a laboratory class

Subject specific skills

Understand the structure and sequence content of both Prokaryotes and Eukaryotes

Understand the control of gene expression at multiple layers - from chromosomal context, to expression, to modifications of the product

Transferable skills

Self directly learning
Adult learning
critical appraisal of source material

Study

Teaching split

Provider	Weighting
Life Sciences	78%
Warwick Medical School	22%

Study time

Type	Required
Lectures	18 sessions of 1 hour (12%)
Total	150 hours

Type	Required
Supervised practical classes	2 sessions of 3 hours (4%)
Private study	109 hours (73%)
Assessment	17 hours (11%)
Total	150 hours

Private study description

107.5 hrs self-study and directed reading
1.5h per lab student preparation

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D2

	Weighting	Study time	Eligible for self-certification
In-class assignment	30%	15 hours	No
Laboratory designed around cell biology concepts			
Closed-book end-of-year examination	70%	2 hours	No
In-person locally-timetabled closed-book end-of-year examination			

Assessment group R2

	Weighting	Study time	Eligible for self-certification
Closed-book examination	100%		No
In-person locally-timetabled closed-book end-of-year examination			

Feedback on assessment

Cohort level written feedback for both laboratory and examination outcome.

Past exam papers for LF206

Availability

Courses

This module is Core for:

- Year 2 of UBSA-C700 Undergraduate Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)
    - Year 2 of C1A2 Biochemistry
    - Year 2 of C700 Biochemistry
- Year 2 of ULFA-C702 Undergraduate Biochemistry (with Placement Year)
- Year 2 of ULFA-C1A6 Undergraduate Biochemistry with Industrial Placement (MBio)
- Year 2 of UBSA-C1B9 Undergraduate Biomedical Science
- ULFA-C1A3 Undergraduate Biomedical Science (MBio)
    - Year 2 of C1A3 Biomedical Science
    - Year 2 of C1B9 Biomedical Science
- Year 2 of ULFA-C1A7 Undergraduate Biomedical Science with Industrial Placement (MBio)
- Year 2 of ULFA-CB18 Undergraduate Biomedical Science with Placement Year
- Year 2 of UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development

This module is Core optional for:

- Year 2 of UIPA-C1L8 Undergraduate Life Sciences and Global Sustainable Development

This module is Optional for:

- Year 2 of UBSA-3 Undergraduate Biological Sciences
- Year 2 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- Year 2 of ULFA-C113 Undergraduate Biological Sciences (with Placement Year)
- Year 2 of ULFA-C1A5 Undergraduate Biological Sciences with Industrial Placement (MBio)
- Year 2 of ULFA-B140 Undergraduate Neuroscience (BSc)
- Year 2 of ULFA-B142 Undergraduate Neuroscience (MBio)
- Year 2 of ULFA-B143 Undergraduate Neuroscience (with Industrial Placement) (MBio)
- Year 2 of ULFA-B141 Undergraduate Neuroscience (with Placement Year) (BSc)

This module is Core option list B for:

- Year 2 of UMDA-CF10 Undergraduate Integrated Natural Sciences (MSci)