

# CH172-15 Introduction to Chemical Biology

**26/27**

**Department**

Chemistry

**Level**

Undergraduate Level 1

**Module leader**

Matthew Jenner

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

This "Introduction to Chemical Biology" module is designed to provide students with a comprehensive understanding of the interdisciplinary field that merges the principles of chemistry and biology. Chemical biology explores the intricate relationship between chemical processes and biological systems, elucidating how chemical compounds interact with and affect living organisms at the molecular level. Throughout this module, students will be introduced to fundamental concepts and techniques in chemical biology, enabling them to appreciate the critical role chemistry plays in unravelling complex biological phenomena and advancing the fields of medicine, drug discovery, and biotechnology.

[Module web page](#)

### Module aims

The aim of this module is to provide students with an interest in the chemistry-biology interface with a fundamental understanding of chemical biology from the top down. We will begin at the level of the whole cell and move through topics relevant to cell function and compartmentalisation, transcription and translation of proteins, and biomolecular structure. In the last part of the module,

students will apply their understanding to study of digestion, glycolysis, the citric acid cycle, ATP synthesis, and the wider context of biosynthesis. Concepts and approaches covered in lectures are reinforced in workshop sessions.

## 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.

Cell Structure (5 lectures) covering: Introduction to cell and organelle structure; The cell envelope and other barriers; Cytoskeleton and Cell Motility; Organelles and Protein Trafficking; Extracellular Matrix and Cell-Cell Interactions.

Genes to Proteins (5 lectures) covering: Introduction to Genes and Proteins; Nuclei Acid structure; Transcription; Translation; Restriction enzymes and plasmids

Biomolecular structure (5 lectures) covering: Introduction to Biomolecules and Macromolecules; Protein Structure; Protein folding; protein-protein interactions; Key techniques in structural biology; Protein activity and disease

Mouth to Molecule (5 lectures) covering: Metabolism and Digestion; Glycolysis in cytoplasm; Citric Acid cycle; Electron Transport chain for ATP synthesis; Integrated Metabolism

## Learning outcomes

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

- Understand the key components of cell structure and how these elements vary across species.
- Understand the requirement for compartmentalisation in cells, and the molecules the cell uses to build these compartments
- Understand the process of protein transcription and translation, as well as where proteins end up in the cell
- Understand the chemical properties and structural features of amino acids, nucleic acids, carbohydrates, proteins and DNA
- Understand the processes of digestion, glycolysis, the citric acid cycle, ATP synthesis, and how these processes contribute to biosynthesis

## Indicative reading list

[Reading lists can be found in Talis](#)

[Specific reading list for the module](#)

## Interdisciplinary

This module delivers material at the chemistry-biology interface. In future years it may be part of a new Chemical Biology Degree that teaches the principles and practices of chemical biology

alongside chemistry.

## Subject specific skills

Understanding of key components of cell structure and how these elements vary across species, the requirement for compartmentalisation in cells, and the molecules the cell uses to build these compartments, the process of protein transcription and translation, as well as where proteins end up in the cell, the chemical properties and structural features of amino acids, nucleic acids, lipids, proteins and DNA. Module concludes with an integrated view of metabolism and digestion, highlighting how citric acid cycle products contribute to the biosynthesis of amino acids, nucleic acids, and lipids. Students will also learn to use structural databases and protein structural visualisation tools.

## Transferable skills

Problem solving  
Written communication  
Oral communication

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## Study

### Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Seminars	4 sessions of 1 hour (3%)
Private study	90 hours (60%)
Assessment	36 hours (24%)
Total	150 hours

### Private study description

Directed reading, completion of assessed work, revision for examination

### Costs

No further costs have been identified for this module.

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## Assessment

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

## Assessment group D1

	<b>Weighting</b>	<b>Study time</b>	<b>Eligible for self-certification</b>
Workshop 1	5%	6 hours	No
This workshop will comprise an in class test that students will take in small teams, and will follow a "pub quiz" format. These will be marked and this mark will account for 5% of the student's grade in the module.			
Workshop 2	5%	6 hours	No
This workshop will comprise in-class test questions that students must work through in the workshop session, and submit for marking. These will be marked and this mark will account for 5% of the student's grade in the module.			
Workshop 3	5%	6 hours	Yes (extension)
Students will undertake a computer based workshop where they will be taught to use structure visualisation software to complete a set of tasks and answer specific questions. These will be marked and this mark will account for 5% of the student's grade in the module.			
Workshop 4	5%	6 hours	No
This workshop will comprise an in class test that students will take in small teams, and will follow a "pub quiz" format. These will be marked and this mark will account for 5% of the student's grade in the module.			
Centrally-timetabled examination (On-campus) Closed book examination	80%	12 hours	No

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- Students may use a calculator
  - Periodic Tables
  - Answerbook Green (8 page)

## Assessment group R1

	<b>Weighting</b>	<b>Study time</b>	<b>Eligible for self-certification</b>
Resit examination Closed book examination	100%		No

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- Answerbook Green (8 page)
  - Students may use a calculator

## Feedback on assessment

Assessed work will be either be submitted and marked in the workshop sessions or via Moodle, and markers will provide feedback / model answers via Moodle on submitted work. Examination feedback will involve cohort-level feedback on how the student cohort performed on each question, and common mistakes made.

[Past exam papers for CH172](#)

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## Availability

### Courses

This module is Optional for:

- UCHA-4 Undergraduate Chemistry (with Intercalated Year) Variants
  - Year 1 of F101 Chemistry (with Intercalated Year)
  - Year 1 of F122 Chemistry with Medicinal Chemistry (with Intercalated Year)
- UCHA-3 Undergraduate Chemistry 3 Year Variants
  - Year 1 of F100 Chemistry
  - Year 1 of F121 Chemistry with Medicinal Chemistry
- UCHA-F110 Undergraduate Master of Chemistry (with Industrial Placement)
  - Year 1 of F100 Chemistry
  - Year 1 of F110 MChem Chemistry (with Industrial Placement)
  - Year 1 of F112 MChem Chemistry with Medicinal Chemistry with Industrial Placement
- Year 1 of UCHA-F107 Undergraduate Master of Chemistry (with Intercalated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
  - Year 1 of F109 MChem Chemistry (with International Placement)
  - Year 1 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
  - Year 1 of F100 Chemistry
  - Year 1 of F105 Chemistry
  - Year 1 of F110 MChem Chemistry (with Industrial Placement)
  - Year 1 of F109 MChem Chemistry (with International Placement)
  - Year 1 of F125 MChem Chemistry with Medicinal Chemistry
- Year 1 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry (with Intercalated Year)