CH3H6-15 Chemical Biology

26/27

Department
Chemistry
Level
Undergraduate Level 3
Module leader
Claudia Blindauer
Credit value
15
Module duration
5 weeks
Assessment
20% coursework, 80% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module builds on concepts covered in Year 2 modules and laboratories and expands knowledge and understanding of Bio-Organic and Bio-Inorganic Chemistry. The module is split into 2 coherent topics that draw upon each other. The lectures will be supported by practical workshops and case studies.

Module aims

By the end of the module, students will have built up subject knowledge in Bio-Organic and Bio-Inorganic Chemistry, allowing them to have contextual understanding of contemporary examples of biosynthesis and ability to interpret and evaluate examples from the literature.

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.

Topic I: Metals in Biomolecules, including:

1. Introduction and important concepts

2. Techniques to study metals in biological systems
3. Metal ion transport and storage
4. Introduction to redox (metallo-)biochemistry including electron transfer

Topic II: Natural products biosynthesis, including

1. Introduction to Natural Products and their Biosynthesis
2. Coenzymes – functions and mechanisms
3. Aromatic polyketide biosynthesis
4. Complex polyketide biosynthesis/non-ribosomal peptide synthesis including metallophores
5. Terpenes biosynthesis

Learning outcomes

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

- Have built up subject knowledge in Bio-Organic and Bio-Inorganic Chemistry to an appropriate level. This includes: o Essential metal ions, their interactions with biomolecules, and their functions o Discovery, origins, and biosynthetic mechanisms of bioactive natural products (including methodology).
- Have developed contextual understanding of contemporary examples such as: o Mechanisms of polyketide antibiotic biosynthesis o How terpenoid antimalarials, anticancer agents, and flavours and fragrances are assembled o Mechanism of siderophore (and other metallophore) biosynthesis o Biological function of siderophores (and other metallophores) o Mode of action of selected (metallo-)enzymes involved in Biosynthesis
- - Have developed the ability to interpret and evaluate examples from the literature, such as: o Spectroscopic and other data to understand properties and mode of action of (metallo-)proteins o Incorporation of isotope-labelled precursors into natural products and application of 13C NMR spectroscopy to elucidating the site of incorporation o Predictive analysis of aromatic polyketide biosynthetic mechanisms, including iterative process for building poly-beta-keto thioesters and their modes of cyclisation via intramolecular aldol condensation/dehydration cascades o Complex polyketide biosynthetic mechanisms, including modular process for functional group modification during chain assembly, mechanisms of stereocontrol, and chain release via macrolactonization o Predictive analysis of terpenoid biosynthetic mechanisms, including iterative process for building polyisoprenoid precursors and their modes of cyclisation and rearrangement via carbocatioinic intermediates o Nonribosomal peptide biosynthetic mechanisms, including modular process for activation, condensation, and modification of amino acid building blocks and creation and non-proteinogenic precursors

Indicative reading list

Reading lists can be found in Talis

Research element

Assessed work component is student-led research

Subject specific skills

Ability to interpret and evaluate literature examples within the field of Bio-Organic and Bio-Inorganic Chemistry.

Transferable skills

Communication
Critical Thinking
Digital Literacy
Information Literacy
Problem Solving
Professionalism
Sustainability
Teamwork

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (11%)
Practical classes	5 sessions of 1 hour (3%)
Private study	125 hours (69%)
Assessment	30 hours (17%)
Total	180 hours

Private study description

N/A

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 D1

	Weighting	Study time	Eligible for self-certification
Assessment component			
Flash presentation	20%	30 hours	No
Student-led research into selected natural products, including production of original imagery. Students will work in pairs. 1 slide per student, to be presented in a flash presentation (3 min per pair, i.e. 1.5 min per student).			
Reassessment component			
Flash presentation			No
Student-led research into selected natural products, including production of original imagery. slide per student, to be presented in a flash presentation (2 min per student).			
Assessment component			
Centrally-timetabled examination (On-campus) Written Examination	80%		No

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- Students may use a calculator
- Answerbook Pink (12 page)
- Periodic Tables

Reassessment component is the same

Feedback on assessment

Cohort level examination feedback and individual written feedback provided to students via Moodle/Tabula.

Past exam papers for CH3H6

Availability

Pre-requisites

To take this module, you must have passed:

- Any of
  - CH276-15 Organic Synthesis and Reactivity
  - CH277-15 Inorganic Materials from Complexes to Solids
  - CH278-15 Macromolecules

Courses

This module is Optional for:

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