# MD1A6-30 Embryos and Organisms (MD1A6-30)

## 26/27

**Department**
Warwick Medical School
**Level**
Undergraduate Level 1
**Module leader**
Michael Lewis
**Credit value**
30
**Module duration**
6 weeks
**Assessment**
70% coursework, 30% exam
**Study location**
University of Warwick main campus, Coventry

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## Description

## Introductory description

MD1A6-30 - Integrated Natural Science Embryos and Organisms
The module aims to equip students with the conceptual, computational and practical skills required for the analysis and engineering of eukaryotic organisms and their development.

Module web page

## Module aims

Students will learn to solve scientific problems and perform lab practicals in this area by integrating concepts and approaches from different scientific disciplines, including biology, physics, chemistry and computing, with the underlying mathematics serving as a common language.

## 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.

This module provides students with an integrated exploration of developmental biology, immunology, and parasitology. Students will investigate how mechanical forces and gene expression shape embryonic development, examine the complex mechanisms of the immune system in protecting against microorganisms, and study parasitic organisms, with a specific focus on eukaryotic pathogens. Through a combination of lectures and laboratory sessions, the block will provide hands-on experience in imaging embryonic forces, understanding immune system responses, and exploring the function of proteins from a trypanosome parasite.

## Learning outcomes

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

- Demonstrate the ability to apply creative analytical thinking in order to frame incisive, tractable scientific questions, especially about the structure, organisation and dynamics of embryos and organisms.
- Demonstrate a grasp of physical law as it applies to the properties and behaviours of living embryos and organisms.
- Use mathematical approaches to solve problems relating to the behaviours and interactions of embryos and organisms.
- Describe and discuss how embryos are organised and the forces that drive these processes.
- Describe and discuss how organisms use an immune system to recognise non-self.
- Demonstrate the hands-on practical skills required to perform experimental tests of tractable scientific questions, especially about the structure and dynamics of embryos and organisms
- Harness computational data analysis techniques and statistical approaches to analyse data.
- Access and use the scientific literature effectively.
- Interpret and explain experimental data relating to the organisation and development of embryos, and the migration of immune cells.
- Demonstrate the writing skills required to report experimental results in the format of a scientific paper, including the ability to write an abstract, to write a short critical review of the relevant literature, present results in an appropriate format and detail with appropriate statistics, discuss the results and frame a clear conclusion.
- Describe and discuss how parasites develop and are capable of subverting our immune response to grow.
- Demonstrate the ability to accurately record experimental procedures and results in appropriate detail.
- Operate safely within a laboratory environment.

## Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

## Interdisciplinary

Students will learn to solve scientific problems about embryos and organisms by integrating concepts and approaches from different scientific disciplines, including biology, physics, chemistry

and computing, with the underlying mathematics serving as a common language.

## Subject specific skills

Use critical thinking to frame tractable scientific questions about the structure, organisation and dynamics of embryos and organisms. Manipulate, observe and record results pertaining to experiments on model organisms in a laboratory setting using specialised equipment. Use a microscope to study the activation of immune cells when they encounter an antigen presenting cell. Use flow cytometry to measure the expression of inhibitory proteins at the surface of mammalian cells. Use protein prediction tools to investigate the function of an unknown protein from a parasite, and express the protein for further analysis.

## Transferable skills

Proficient in the use mathematical approaches to scientific solve problems.

A grasp of Good Laboratory Practice and an ability to work safely in the lab environment.

The ability to accurately record experimental procedures and results, in appropriate detail, using open source electronic notebooks.

Harness computational data analysis techniques and statistical approaches to analyse data.

Access and use the scientific literature effectively.

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## Study

## Study time

| Type | Required |
|---|---|
| Lectures | 18 sessions of 1 hour (6%) |
| Tutorials | 18 sessions of 1 hour (6%) |
| Supervised practical classes | 18 sessions of 3 hours (18%) |
| Private study | 130 hours (43%) |
| Assessment | 80 hours (27%) |
| Total | 300 hours |

## Private study description

130 hours self-directed study.

## 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 D3

| | Weighting | Study time | Eligible for self-certification |
|---|---|---|---|
| **Assessment component** | | | |
| 2 x laboratory reports | 50% | 20 hours | No |
| Laboratory reports will be written in the form of a scientific manuscript. each laboratory report will consist of 1500 words | | | |
| **Reassessment component is the same** | | | |
| **Assessment component** | | | |
| Assessment of laboratory skills | 20% | 54 hours | No |
| Assessing the proficiency in laboratory techniques, observing good laboratory practice, engagement and contribution to group experiments. | | | |
| **Reassessment component** | | | |
| Laboratory Skills | | | No |
| A written examination testing knowledge of practical laboratory skills, use of laboratory equipment, basic calculations, experimental procedures and good laboratory practice. Examination questions are reflective of what a student would have learnt during the laboratory practicals, with the theoretical knowledge being present in Laboratory Handbook and the Lab Protocol. | | | |
| **Assessment component** | | | |
| Written Examination | 30% | 6 hours | No |
| **Reassessment component is the same** | | | |

### Feedback on assessment

Laboratory reports - submission annotated and returned, general comments/'what was good'/'what could be improved' alongside marking rubric.

Assessment of laboratory skills - at the end of each two-week laboratory session, block leads will provide comments on proficiency, Good Laboratory Practice (GLP) and engagement/group contribution that arise. Due to the volume of feedback, stock phrases will be provided to the block leads, which may be amended or expanded at the lead's discretion. Further verbal feedback will be given to students on request.
In terms of practicalities, following GLP, executing the laboratory protocol, attaining proficiency in techniques taught and engaging/contributing to group activities (where required) will be based at 62 on the 20-point University scale. Exceptional attainment/contributions will grade higher, whereas disengagement, not observing GLP, and an unwillingness to acquire lab proficiency will score lower. Marks will not take into account whether a student achieved a desired experimental result or not. The block lead will work with the laboratory technician in observing and recording these across the cohort. Feedback will be provided biweekly at the end of each block.

Past exam papers for MD1A6

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## Availability

## Courses

This module is Core for:

- Year 1 of UMDA-CF10 Undergraduate Integrated Natural Sciences (MSci)