

LF213-15 Virology

21/22

Department

Life Sciences

Level

Undergraduate Level 2

Module leader

Emma Anderson

Credit value

15

Module duration

5 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The content in LF213 Virology builds on the introductory first year virology component of BS127 Agents of Infectious Disease.

This module covers the replication strategies of important viruses, the diseases these viruses cause, antiviral therapies, diagnosis and vaccination. Viral replication strategies, how viruses reproduce inside our cells, are the cornerstone of all virology. Molecular knowledge of how a particular virus replicates allows the development of methods of diagnosis, prevention and treatment of disease. These aspects of virology, along with how human viruses emerge and evolve, will be taught within the context of pandemic viruses such as influenza, HIV and coronaviruses.

Module aims

The aim of the module is to explain the biology of important viruses, how they emerge and evolve, how they may be diagnosed, prevented through vaccination, and treated with antiviral therapies.

The primary aim of the laboratory is to provide students with understanding of techniques relevant to the study of virology and also of animal cell tissue culture systems which are fundamental to the analysis of animal viruses as well as some bacterial pathogens. The work is intended to emphasise the novel nature of the replication cycle of viruses, focusing on mammalian viruses.

The work is additionally designed to reinforce and extend information and experience gained in previous lectures and laboratory classes.

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.

Lectures 1-2: Virus-host interactions

1-2. Viruses as pathogens, effects on the host, role of the immune system. Introduction to viral replication, summary of the different types of viral genome. Influenza virus replication. Entry into cell and site of replication. Segmented genome structure. Transcription/replication of genome, translation of virus proteins. Assembly and exit from the cell.

Lectures 3-6: Influenza virus

3-4. Replication cycle of influenza virus; entry into cell and site of replication; segmented genome structure; transcription and replication of genome, translation of virus proteins; assembly and exit from the cell.

5-6. Influenza disease; vaccination; emergence of new strains; adaptation of vaccines.

Lectures 7-10: Human immunodeficiency virus

7-8. HIV replication; receptor binding and fusion; reverse transcription, integration into host genome; transcription and nuclear export of RNA; ribosomal frameshifting; assembly, exit and maturation.

9-10. Emergence and evolution of HIV; development of antiviral therapies; effect of therapy on disease.

Lectures 11-14: Coronaviruses

11-12. Coronavirus replication; receptor binding and entry; translation of genomic RNA; transcription and replication of genome; assembly and exit.

13-14. Emergence and evolution of coronaviruses; methods of diagnosis; vaccination and clinical trials.

Lecture 15: Summary

15. Concepts introduced during the module; similarities and differences between viruses.

Learning outcomes

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

- Level 5 understanding of how viruses evade the host immune system.
- Level 5 understanding of the replication strategies of selected important viruses, and the similarities and differences between them.
- Level 5 understanding of the emergence and evolution of human viruses in a population.
- Level 5 understanding of how viral infections can be diagnosed.
- Level 5 understanding of how vaccines are developed and used to prevent viral infection and disease.

- Level 5 understanding of different types of antiviral therapy, how they are discovered, developed and trialled.
- Understand how to culture and passage of mammalian cells using aseptic technique.
- Understand how to assay the infectivity of mammalian viruses.
- Understand the basis of assays of virus growth.
- Improve data handling skills.

Indicative reading list

Dimmock, N. J., Easton, A. J. and Leppard, K. N. Introduction to Modern Virology, 7th edn. (Wiley-Blackwell, 2016).

Other books to consult:

Collier, L. and Oxford, J. Human Virology, 3rd edn. (Oxford University Press, 2006).

Subject specific skills

Understand the replication strategies of selected important viruses and the similarities and differences between them. Understand how human viruses can emerge from animals and how they evolve in a population. Understand how virus infections can be diagnosed, how vaccines are developed and used to prevent viral infection and disease. Understand different types of antiviral therapy, how they are discovered, developed and trialled.

Transferable skills

Adult learning,
self directed learning,
team based learning
quantitative skills

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Practical classes	3 sessions of 6 hours (12%)
Private study	117 hours (78%)
Total	150 hours

Private study description

117 hrs of self directed learning and revision

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
Virology Lab	30%		Yes (extension)
Online Examination ~Platforms - Moodle	70%		No

- Online examination: No Answerbook required

Assessment group R1

	Weighting	Study time	Eligible for self-certification
Online Examination - Resit	100%		No

- Online examination: No Answerbook required
- Students may use a calculator

Feedback on assessment

lab - individual written feedback

exam - cohort written feedback

[Past exam papers for LF213](#)

Availability

Courses

This module is Core for:

- 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

This module is Optional for:

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