LF211-18 Immunology and Epidemiology

20/21

Department
Life Sciences
Level
Undergraduate Level 2
Module leader
Leanne Williams
Credit value
18
Module duration
10 weeks
Assessment
100% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

The aim of this module is to introduce students to two of the fundamental processes that underpin modern biomedical science: immunology and epidemiology. Together with companion modules dealing with specific pathogens, the module considers many disease processes and their mitigation. Immunology deals with the basic processes of immunity to infection, but also covers aspect of hypersentitivity and auto-immune disease. Epidemiology explains the population biology of pathogens (of which immunology is an important aspect), and applies this to public health decision-making to explain current policy in regards to immunisation, sexually transmitted infections and alcohol consumption.

[Module web page](#)

Module aims

By the end of the module the students should have a good understanding of the basics of the innate and adaptive immune response with a focus on the adaptive immune response and the generation of diversity. Students will be able to apply these fundamentals to the progression of immune-related disease. The students should understand how evidence is used to assign causes

to different diseases, and the underlying theory for the design of public health interventions.

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.

The immunology is presented as an overview of the immune system with a focus on T cell immunity, including:

- Recognition of antigen by the adaptive immune system.
- The TCR and MHC
- T-cell mediated immunity
- The humoral immune response
- Failure of immunity: evasion and subversion and immunodeficiency disease.
- Mucosal immunity
- Inappropriate activation: allergy and autoimmune disease
- Case studies of immune system disregulation and disease, including rheumatoid arthritis, multiple sclerosis, and Crohn's disease

Concepts and examples of epidemiology and public health will span human and animal diseases, infectious and non-infectious diseases (although with emphasis on infectious diseases). There are three equally weighted areas:

- Assessing the Evidence: Introduction to the concepts of measurement and causality.
- Predicting the Dynamics: Development of the concepts of non-linearity in infectious disease dynamics.
- Protecting the Population Health: Introduction to the concepts of public health.

Learning outcomes

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

- have a good understanding of the basics of the innate and adaptive immune response with a focus on the adaptive immune response and the generation of diversity
- Students will be able to apply these fundamentals to the progression of immune-related disease
- The students should understand how evidence is used to assign causes to different diseases, and the underlying theory for the design of public health interventions.

Indicative reading list

Murphy, K. M., Travers, P. and Walport, M. Janeway's Immunobiology, 8th edn. (Garland Science, 2011).
Coggon, D., Rose, G. and Barker, D. J. P. (eds). Epidemiology for the Uninitiated, 5th Ed. (BMJ Publishing Group, 2003). ISBN 0-7279-1604-1. Contains 80 pages.
Keeling, M. J. and Rohani, P. Modeling Infectious Diseases in Humans and Animals (Princeton University Press, 2008). ISBN13: 978-0-691-11617-4

Subject specific skills

Explain the main molecular and cellular players in the innate and adaptive immune system and their interaction.

Explain the role of the immune system in defining self from non-self and how T cells and B cells acquire this discrimination.

Understand how important the balance of the immune system is what happens when the normal status quo is disrupted in disease examples

Interpret and weigh the evidence for and against disease causality, diagnosis and screening.

Emphasise the individual / population differences in disease, diagnosis and pathogen ecology, and explain that most disease comes from small, common risks.

Explain the ideas of non-linear dynamics inherent in transmission dynamics of infectious disease, and the concept of transmission routes of infectious disease.

Show, by example, how public health policy in the UK is based on our current understanding of causality and dynamics.

Integrate all aspects of the module and have a coherent understanding of the complex interactions between the disease causing agent, the host immunological response and population biology and public health.

Transferable skills

Quantitative understanding of data, independent learning / self-directed learning, adult learning and understanding source material

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Study

Study time

Type	Required
Lectures	27 sessions of 1 hour (15%)
Practical classes	6 sessions of 1 hour (3%)
Private study	147 hours (82%)
Total	180 hours

Private study description

118 hrs self-study and directed reading is expected

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 B1

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

- Online examination: No Answerbook required

Reassessment component is the same

Feedback on assessment

Pastoral meetings with tutors

[Past exam papers for LF211](#)

Availability

Courses

This module is Core for:

- UBSA-C1B9 Undergraduate Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 Biomedical Science
  - Year 2 of C1B9 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 UBSA-CB19 Undergraduate Biomedical Science with Intercalated Year