



BIOL367

Immunobiology

S2 External 2016

Dept of Biological Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	8
<u>Graduate Capabilities</u>	10
<u>Changes from Previous Offering</u>	13
<u>Changes since First Published</u>	13

Disclaimer

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General Information

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Credit points

3

Prerequisites

(12cp in BIOL units at 200 or 300 level) or admission to GCertBiotech

Corequisites

Co-badged status

Unit description

This unit studies the relationship between infectious micro-organisms, and the animals and plants that they infect. The unit also focuses on the effects of environmental change on the ability of organisms to cope with disease. It begins by investigating the ecology of disease and the way it moulds the immune systems of plants and animals. We then describe the basic paradigms used by plants and animals to detect the presence of infectious agents and activate immune responses against them. The unit ends by discussing the key methods used by different organisms to kill pathogens and overcome infection. Throughout the unit we focus on systems that have direct relevance to medicine, agriculture or aquaculture, highlighting new discoveries that are changing the face of modern immunology.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

Explain why all animals and plants need immune systems

Describe how the immune system contributes to the maintenance of homeostasis

Identify the cells and molecules in animals and plants that contribute to immune responses

Conceptualise immune systems in terms of three distinct process: recognition, induction and effect

Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response

Carry out experiments using potentially hazardous material safely following Macquarie University sanctioned protocols

Collect experimental data accurately and analyse, graph and apply statistical methods to allow interpretation of the results

General Assessment Information

The pass mark for this unit will be 50% of the final total marks.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final examination	50%	No	Exam Period
Midsemester test	20%	No	12/9/16 (internals)
Practical reports	24%	No	One week after each prac class
Computer tutorial quiz	6%	No	tba on iLearn

Final examination

Due: **Exam Period**

Weighting: **50%**

The final examination will be a written exam comprising two sections. It will test information provided in both the lectures and the practical classes, with a weighting toward lectures.

On successful completion you will be able to:

- Explain why all animals and plants need immune systems

- Describe how the immune system contributes to the maintenance of homeostasis
- Identify the cells and molecules in animals and plants that contribute to immune responses
- Conceptualise immune systems in terms of three distinct process: recognition, induction and effect
- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response

Midsemester test

Due: **12/9/16 (internals)**

Weighting: **20%**

The Mid Semester test will be comprised of multiple choice questions that are designed to assess your understanding of lecture material. For externals, the mid-semester test will be held on the first day of the on -campus session (Tuesday 27 September 2016)

On successful completion you will be able to:

- Explain why all animals and plants need immune systems
- Describe how the immune system contributes to the maintenance of homeostasis
- Identify the cells and molecules in animals and plants that contribute to immune responses
- Conceptualise immune systems in terms of three distinct process: recognition, induction and effect
- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response

Practical reports

Due: **One week after each prac class**

Weighting: **24%**

You will be required prepare a practical class report presenting and analysing experimental data collected in practical classes, and to answer a series of questions based on each set practical class notes. There are four practicals in BIOL367. Each report is work 6 marks out of the 100 mark total for the unit. Practical class reports must be submitted in the week following the practical (or for external students on the date specified during semester).

On successful completion you will be able to:

- Carry out experiments using potentially hazardous material safely following Macquarie University sanctioned protocols
- Collect experimental data accurately and analyse, graph and apply statistical methods to

allow interpretation of the results

Computer tutorial quiz

Due: **tba on iLearn**

Weighting: **6%**

Answer a number of questions relating to an online tutorial on antibody structure.

On successful completion you will be able to:

- Identify the cells and molecules in animals and plants that contribute to immune responses
- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response

Delivery and Resources

Classes

- There are two weekly one hour lectures (Monday 11-12am, [E7B T3 Theatre](#), Thursday 12-1am [E7B T2 Theatre](#)) and four 3 hour practical sessions (E8A120/160, 2pm – 5pm Monday OR 10am – 1pm Tuesday). The timetable for classes can be found on the University web site at: <https://timetables.mq.edu.au/2016/Reports/List.aspx>
- Depending on class sizes, practical classes may be offered in two streams (A and B) in alternating weeks. If needed, the allocation of students to streams A or B will be made during the introductory practical class sessions on Monday 8 August and Tuesday 9th August, 2016 (week 2)
- For external students, there will be a single on-campus session on Tuesday - Thursday 27-29 September
- **Attendance at practical sessions is not a compulsory component of this unit. However, information provided during the practical classes will be examined in the final examination. Data collected during the practical classes will also be required to complete the practical class reports.**

Required and Recommended texts and/or materials

- *Cellular and Molecular Immunology*, 8th Edition. Abul K. Abbas, Andrew H. Lichtman, and Shiv Pillai. Saunders Elsevier Publishing (<https://evolve.elsevier.com/cs/product/9780323222754?role=student>) - this is an extremely comprehensive textbook with detailed information on most of the topics covered in lectures. Many images in the lecture graphics are taken from this book. This is the most recent edition, but previous editions should be OK. When reading this textbook, you should remember that Biol367 takes a different approach to teaching immunobiology, and so does not refer to concepts such as "innate" and "adaptive" immunity. So if there are apparent contradictions in the textbook, always refer back to the lectures as a guide. The textbook provides access to the Elsevier Evolve Learning website, which provides additional material such as animations of key processes.

Lecture graphics

- Lecture graphics will be available online on the unit website (via iLearn) prior to each lecture. There are 20 lectures in Biol367 covering the major topics of *recognition*, *induction* and *effect*. Each lecture has a series of learning objectives described in terms of Key Topics on the second slide of each lecture *Powerpoint* file. You will need to understand each of these key topics. The lecture graphics mainly use images from the textbook and from primary research articles and reviews. **The written text on the graphics is kept to a minimum and you will need to fill in the gaps with your own notes from the lectures** and, where necessary, from the textbook. The lecture series does not cover topics in the order in which they are presented in the textbook so that graphics for a single lecture may come from different chapters of the textbook.

Unit web page

- This unit operates as an online unit via iLearn. The website will contain lecture and practical class notes, and will be updated regularly with additional information and announcements. We encourage you to visit the website frequently to check for updates.

Unit Schedule

BIOL367, IMMUNBIOLOGY – TIMTABLE, 2016

WEEK	DATE	LECTURE	PRACTICAL
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1	1. Introduction to unit	None
	2. Summary of an immune response: recognition, induction and effect	
2	3. Self and not-self: why do animals and plants need immune systems?	Introduction to practical classes
	4. Pathogens, parasites, competitors and symbionts	
3	5. Antigens and PAMPs: What defines not-self?	1: Pattern recognition (stream A)
	6. Am I me, or not them? Recognition paradigms in plants and animals	
4	7. Pattern recognition molecules: lectins and Toll-like receptors	1: Pattern recognition (stream B)
	8. Hypervariable recognition molecules I: New immune response gene families of invertebrates and plants	
5	9. Hypervariable recognition molecules II: Antibodies and t-cell receptors	2: Proteolytic effector cascades I: Phenoloxidase (stream A)
	10. Danger, anti-viral states and inflammation	
6	11. Intracellular antigens, antigen processing and presentation	2: Proteolytic effector cascades I: Phenoloxidase (stream B)
	12. Activation of T-cells by processed antigens	
7	Mid semester test	no practicals
	No lecture	
	Mid semester break (Sept 20 - Oct 6)	
8	No lecture, (Labour Day public holiday, Monday)	No practical classes (Labour Day public holiday, Monday)
	13. Signalling, clonal selection and memory	
9	14. Autoreactivity and education: <i>To thine own self be true</i>	3. Proteolytic effector cascades II: Complement (stream A)
	15. Plant defence I: <i>R</i> genes and <i>AVR</i> genes – the gene-for-gene model – recorded only	
10	16. Plant defence II: systemic acquired resistance – recorded only	3. Proteolytic effector cascades II: Complement (stream B)
	17. Effector cascades: complement and phenoloxidase	

11	18. Antimicrobial proteins	4: Clinical Immunology: The Immunology of Pregnancy (stream A)
	19. The phagolysosomal system	
12	20. Synthesis	4: Clinical Immunology: The Immunology of Pregnancy (stream B)
	No lectures	

Task	Weight (%)	Due Date		Linked Learning Outcomes	Linked Graduate Capabilities
		Internals	Externals		
Mid-semester Test	20	Monday, 12 September	Tuesday, 27 September	1,2,3,4,5	1,2
Practical class reports	24	One week following practical classes	tba	1,2,3,4,5	7,8
Computer tutorial online quiz	6	tba	tba	1,2,3,4,5	7,8
Final Exam	50	exam period	exam period	1,2,3,4,5	1,2

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Assessment task

- Practical reports

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response
- Carry out experiments using potentially hazardous material safely following Macquarie University sanctioned protocols

Assessment task

- Practical reports

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Explain why all animals and plants need immune systems

- Describe how the immune system contributes to the maintenance of homeostasis
- Identify the cells and molecules in animals and plants that contribute to immune responses
- Conceptualise immune systems in terms of three distinct processes: recognition, induction and effect
- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response
- Carry out experiments using potentially hazardous material safely following Macquarie University sanctioned protocols
- Collect experimental data accurately and analyse, graph and apply statistical methods to allow interpretation of the results

Assessment tasks

- Final examination
- Midsemester test
- Practical reports
- Computer tutorial quiz

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Explain why all animals and plants need immune systems
- Identify the cells and molecules in animals and plants that contribute to immune responses
- Collect experimental data accurately and analyse, graph and apply statistical methods to allow interpretation of the results

Assessment tasks

- Final examination
- Midsemester test
- Practical reports
- Computer tutorial quiz

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Describe how the immune system contributes to the maintenance of homeostasis
- Identify the cells and molecules in animals and plants that contribute to immune responses
- Collect experimental data accurately and analyse, graph and apply statistical methods to allow interpretation of the results

Assessment tasks

- Practical reports
- Computer tutorial quiz

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Explain the integrated functions of different cells and molecules that are needed to produce a coordinated immune response
- Collect experimental data accurately and analyse, graph and apply statistical methods to allow interpretation of the results

Assessment tasks

- Final examination
- Practical reports

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work

with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Carry out experiments using potentially hazardous material safely following Macquarie University sanctioned protocols

Changes from Previous Offering

- two practical classes deleted
- one new online computer tutorial
- no seminars

Changes since First Published

Date	Description
19/07/2016	Key dates updates