



BIOL606

Comparative Physiology

S1 External 2017

Dept of Biological Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

Unit convenor

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Tutor

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Credit points

4

Prerequisites

Admission to MBiotech or MConsBiol or GradDipConsBiol or GradCertConsBiol or MSc

Corequisites

Co-badged status

Unit description

All living things share a series of basic cell processes that are vital to life as we know it: these include membrane integrity, transport and energy transduction, enabling microorganisms, fungi, plants and animals to grow, develop and reproduce. However, these processes have evolved from their prokaryotic origins in eukaryotes, now varying qualitatively across taxa. For example, at the cell level, signal amplification, hormonal regulation, sensory responses, photosynthesis, locomotion and immune responses are examples of adaptations that are genetically distinct in either plants or animals. Within the life cycle of a single organism, expression of these gene combinations determines the way that organisms develop and acclimate to their immediate environment. This unit will explore the full range of adaptations across Kingdoms and how specific gene combinations are expressed to enable life to flourish. Such events will be viewed primarily through the prism of physiology but with reference to morphology, gene expression and metabolism.

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:

1. Describe how organisms gain energy, grow, and develop
2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
4. Analyse collected experimental data and relate results to established physiological phenomena
5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
6. Relate your knowledge of physiology to applications in biotechnology and medicine

General Assessment Information

Assessment for this unit consists of a mixture of quizzes, a written assignment, a short test and a final exam. Submission of all assessments and completion of all tests is essential for adequate progress, since all assessment tasks are required to master the content of this unit. Most importantly, it will be essential to keep pace with the quizzes, as marks accrue weekly throughout the semester.

Students must receive at least a PASS ($\geq 50\%$) for the in-session assessment tasks (weighting of 60%) and must also achieve at least a PASS ($\geq 50\%$) in the final exam (weighting of 40%) in order to pass this unit.

All assessments will be graded and marks returned to students within three weeks of the assessment due date. Marks will be available on Gradebook in iLearn. Feedback on the written assignment will be provided through Turnitin when the marks are released.

Weekly 'lecture' quizzes:

Quiz questions will be inserted into the lecture slides each week, based on the lecture material. Quizzes will be open on iLearn each week from 9 am Monday to 9 am Wednesday. Once you start the quiz you have 12 minutes to complete it and you are only allowed one attempt. These questions are designed in part to ensure you have covered the lecture material before the practicals so you have the best opportunity to learn from the practical exercises. There are a total of 12 weekly quizzes, starting in Week 2. The quizzes will be automatically marked and the marks and correct answers will be released once the submission window has closed.

Weekly 'practical' quizzes:

These quiz questions will be made available on iLearn during the on-campus sessions and will be based on the material covered in the practicals. Questions will be available on iLearn during practical sessions and answers must be submitted before the completion of each practical session. These questions are designed to test your understanding of the practical exercises. There are a total of 10 practical quizzes (each with multiple questions). The quizzes will be automatically marked and the marks and correct answers will be released once all of the practical sessions for that topic (including internals) have finished.

Written assignment:

Students will choose a physiological process from a list provided and write a 1000-word report (including references in Harvard style) on its control points, impact on overall cell function and response to the environment. A rubric which outlines the assessment criteria will be made available on iLearn.

This report is due by 11:59 pm Sunday 7 May 2017 (end of Week 8) and must be submitted through the Turnitin link in the Week 8 section of iLearn (no hardcopy is required). Students are reminded that Turnitin is plagiarism checking software and all assignments must comply with the Academic Honesty Policy of the university, which can read at: http://www.mq.edu.au/policy/docs/academic_honesty/policy.html.

Apart from plagiarising other external sources of material, be aware that your work will be cross-checked against other students' work. We encourage you to discuss ideas with your fellow students but you must write original work for submission. Assignments can only be submitted to Turnitin once, so make sure your assignment is finalised before you submit.

Mid-semester test:

A mid-semester test will be held in the afternoon of Wednesday 26 April 2017 (first day of the second on-campus session). The test will consist of short-answer questions and will cover all lecture content up to and including Week 6 and practical content presented before the test (i.e. lectures 1-12 and practicals 1-5). Calculators without text retrieval capacity will be allowed into the exam room. This test will be different to the test completed by the internal students.

Final examination:

The final exam will be closed book and three hours duration and held in the official university examination period at the end of the session. The exam will consist of short- and extended-answer questions. The short-answer questions will be drawn from the sample short answer questions made available each week on iLearn. Calculators without text retrieval capacity will be allowed into the exam room. For further information please see the university examination policy at: https://www.mq.edu.au/policy/docs/assessment/schedule_4.html

Discussion group:

Discussion with the unit convenor of principles arising from the unit. This will require an overarching understanding of the significance of the full range of physiological processes of living things discussed in this unit. The aim is that students should be able to integrate diverse processes, drawing upon content of both lectures and practicals.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Weekly quizzes</u>	15%	No	Weekly by Wednesday 9 am
<u>Practical quizzes</u>	15%	No	During on-campus sessions
<u>Mid-semester test</u>	10%	No	During on-campus session 2
<u>Written assignment</u>	15%	No	11:59 pm Sunday 7 May 2017
<u>Discussion group</u>	5%	No	Week 13
<u>Final exam</u>	40%	No	Exam period

Weekly quizzes

Due: **Weekly by Wednesday 9 am**

Weighting: **15%**

Online quizzes & problem solving covering lecture material

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved

Practical quizzes

Due: **During on-campus sessions**

Weighting: **15%**

Online quizzes to be completed during practical sessions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including

transport systems and responses to stimuli

- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Analyse collected experimental data and relate results to established physiological phenomena

Mid-semester test

Due: **During on-campus session 2**

Weighting: **10%**

Short-answer questions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Analyse collected experimental data and relate results to established physiological phenomena

Written assignment

Due: **11:59 pm Sunday 7 May 2017**

Weighting: **15%**

1000-word report explaining a physiological process, its control points, impact on overall cell function and response to the environment - details to be advised

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Discussion group

Due: **Week 13**

Weighting: **5%**

Discussion of principles arising from the unit

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Final exam

Due: **Exam period**

Weighting: **40%**

Short answer & higher order questions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Analyse collected experimental data and relate results to established physiological phenomena
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Delivery and Resources

Lectures

There are two live lectures each week: Monday 10-11 am in E7B T4 and Tuesday 2-3 pm in W5A T1. These lectures are recorded and made available through the Echo360 link on the iLearn page soon after the lecture is presented. Lectures are available in audio-only or video format where the material projected onto the screen is captured along with the voice of the lecturer. Since some topics in this unit are not dealt with in the textbook, it is important to listen to/watch all lectures, especially as assessed quizzes are embedded in each lecture. Students who do not listen to/watch all lectures often find it difficult to manage the quiz regime and

therefore to pass the unit.

Practical sessions

Practical sessions are held in E8A 120 (the RED lab), this is building E8A room 120 on the ground floor. There are two on-campus sessions, the first at the end of Week 2 (11-12 March) and the second in the mid-semester break (26-28 April). You are required to attend for the full duration of both on-campus sessions. Please be aware that parking is not free on-campus and there are security guards patrolling and issuing fines for vehicles without permits.

You need to bring a lab notebook, pencils and pens with you to the practical sessions for making notes and drawings of what you observe. A calculator would also be an advantage. Your textbook will be referred to during lab classes so having it on hand will help.

Safety

Students are required to bring a lab coat to all practical sessions. Lab coats can be purchased from the campus shop (there are no lab coats available for loan in practical sessions). Closed in shoes are required for practical classes. If you do not have closed in shoes you will not be allowed into the lab and will therefore miss out on that week's practical material and associated assessment marks.

Technology

A computer with internet access is required to access iLearn which contains the unit materials and assessments. If you do not have a computer at home then computers with internet access are available in the Library for all students to use. We expect you to log on to iLearn several times each week so you can:

- Check for announcements
- Download lecture notes (available as pdf files)
- Complete weekly online quizzes and submit assessments
- Post questions and replies on the discussion board
- Check your grades

Remember that we can check your individual log-ins in iLearn so best that you make this a habit.

There are 16 desktops in the practical labs but probably 32 students. The lab-based quizzes will require internet access. You can easily complete the quizzes using a smartphone or tablet connected to the university Wi-Fi. However, if you do not have a convenient way of doing these quizzes with your own device, then locate yourself at a desktop computer.

Practical notes will be available online but are kept deliberately short in order to make printing off these notes practicable. You may use a tablet in the practical sessions but paper notes are often more convenient in the reality of wet surfaces, lots of equipment and risk on things toppling

overboard.

Textbook and readings

The recommended textbooks for this unit are:

- *Plant Physiology* by Taiz and Zeiger – published by Sinauer;
- *Animal Physiology* by Hill, Wyse and Anderson – published by Sinauer; and
- *Biology of Plants* by Evert and Eichhorn – published by Freeman.

These will be available for purchase from the Co-op Bookshop on-campus. Limited copies will be available in the Reserve Section of the library. We recommend textbooks but do not insist on them. However, these are classical texts which are in at least their fourth edition and there will often be good second-hand copies to be found. We are confident that the principles described in these texts are enduring and they will be decades (at least) before they are no longer relevant to the living world.

Unit Schedule

Lectures and assessments

Week	Start date (Monday)	Lecture topic	Weekly quiz (due Wed 9 am)
1	27 Feb	Introduction to molecules, cells and evolution	No
2	6 Mar	Gaining the substrates for metabolism	Yes
		On-campus session 1 Sat 11 to Sun 12 March 2017	
3	13 Mar	Primary energy metabolism	Yes
4	20 Mar	Using energy (carbon)	Yes
5	27 Mar	Symbiosis	Yes
6	3 Apr	Cell division	Yes
7	10 Apr	Growth	Yes
Break	17 to 28 Apr	On-campus session 2 Wed 26 to Fri 28 April 2017	No

8	1 May	Development & cell types - plants	Yes
		Written assignment Due 11:59 pm Sunday 7 May 2017	
9	8 May	Development & cell types - animals	Yes
10	15 May	Hormones	Yes
11	22 May	Response to external stimuli	Yes
12	29 May	Defence	Yes
13	5 Jun	Movement/intracellular signalling	Yes
Exam period	12 to 30 June	Final exam	

On-campus sessions

On-campus session	Week	Dates	Practicals (including practical quizzes)	Notes
1	2	Sat 11 – Sun 12 March 2017	1 - 4	
2	Second week of break	Wed 26 – Fri 28 April 2017	5 - 10	Mid-semester test on Wed 26 April 2017

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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.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 (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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

Absences from lectures and practicals that lead to missed assessments must be covered by a medical certificate (this needs to be lodged through Ask.mq.edu.au) unless otherwise discussed with the unit convenor. Any assignments submitted after the due date will incur penalties for late submission. Extensions will only be granted in extenuating circumstances with supporting documentation. Matters of a personal nature can be raised in strict confidence with the unit convenor.

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

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:

Learning outcomes

- 4. Analyse collected experimental data and relate results to established physiological phenomena
- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Written assignment
- Discussion group
- Final exam

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

- 4. Analyse collected experimental data and relate results to established physiological

phenomena

- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

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

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

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

- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Analyse collected experimental data and relate results to established physiological phenomena
- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Mid-semester test
- Written assignment
- Discussion group

- Final exam

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

- 4. Analyse collected experimental data and relate results to established physiological phenomena
- 5. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Written assignment
- Discussion group
- Final exam

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

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Analyse collected experimental data and relate results to established physiological phenomena
- 5. Address a major physiological process in the form of a scientific report based on

reference to the scientific literature

- 6. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

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 outcomes

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussion group
- Final exam

Changes from Previous Offering

New unit – no previous offering

Changes since First Published

Date	Description
31/01/2017	General supplementary exam information added