



# MEDI304

## Advanced Clinical Science

S2 Day 2017

*Medicine and Health Sciences Faculty level units*

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#### **Disclaimer**

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# General Information

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Credit points

3

Prerequisites

Admission to BClinSc and ((39cp at 100 level or above) including CBMS104 and MEDI209 and MEDI303)

Corequisites

Co-badged status

Unit description

This unit outlines concepts in cell biology and biochemistry that are fundamental to our understanding of human biology, and diseases. Biochemistry and cell biology are central to our understanding of disease and medicine. The topics in this unit include signal transduction, cytoskeletal dynamics, mitochondrial dysfunction, protein metabolism, stem cells and molecular targeted therapies. These topics relate to cellular pathways and processes involved in cellular homeostasis, and perturbations and defects that lead to diseases (e.g. cancer and neurodegenerative disorders). Practical classes complement the course material and allow students to consolidate and apply conceptual elements to help shape their understanding. Laboratory techniques used include analysis of signalling cascades, and microscopy.

## 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:

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## General Assessment Information

Grade descriptors and other information concerning grading are contained in the Macquarie University Grading Policy, which is available at: <http://www.mq.edu.au/policy/docs/grading/policy.html>

To pass this unit, students must demonstrate sufficient evidence of achievement of the learning outcomes and complete all assessment tasks.

Further details for each assessment task will be available on [iLearn](#).

All final grades in the Bachelor of Clinical Science are determined by a grading committee and are not the sole responsibility of the Unit Convenor.

Students will be awarded one of these grades plus a Standardised Numerical Grade (SNG). The SNG is not necessarily a summation of the individual assessment components. The final grade and SNG that are awarded reflect the corresponding grade descriptor in the Grading Policy.

### Attendance requirements

Students are required to attend the practical classes in this unit. Where a student does not attend the practical, they will not pass this unit.

Students are required to attend a minimum of 80% of their scheduled learning activities (except where practical classes are compulsory), unless special consideration is granted by the unit convenor. Where a student does not attend a minimum of 80% of classes, they may not be able to pass this unit.

## Extensions

Applications for assessment task extensions must be submitted via: [www.ask.mq.edu.au](http://www.ask.mq.edu.au).

For further details please refer to the Disruption to Studies Policy available at: [http://mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://mq.edu.au/policy/docs/disruption_studies/policy.html)

## Late Submission

All assignments which are officially received after the due date, and where no extension has been granted, will incur a deduction of 10% for the first day, and 10% for each subsequent day including the actual day on which the work is received. Weekends and public holidays are included. For example:

Due date	Received	Days late	Deduction	Raw mark	Final mark
Fri 14th	Mon 17th	3	30%	75%	45%

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Multiple Choice Quiz</a>	15%	No	Week 7
<a href="#">Report and Group Presentation</a>	45%	No	Weeks 8 and 11
<a href="#">Final Exam</a>	40%	No	Exam period

## Multiple Choice Quiz

Due: **Week 7**

Weighting: **15%**

A summative quiz assessment will be held in week 7 to assess the content of the first 6 weeks of the unit. The duration of the quiz will be 60 mins and they will be completed in tutorial class.

On successful completion you will be able to:

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology

## Report and Group Presentation

Due: **Weeks 8 and 11**

Weighting: **45%**

The laboratory induction (lab safety, hazards and personal protective equipment) must be completed prior to attending the laboratory practical. The practical task will run over three weeks in Weeks 5-7 and students are expected to submit laboratory report (approx. 1500 words) in scientific format (Introduction, Methods, Results and Discussion) with References. The word count includes Introduction, Results and Discussion, and does not include the Methods and References. The practical report will be due in Week 8 and will contribute to 25% of the grade.

Students will work in groups to research and present a selected topic to the class. Students will use their understanding of the fundamentals of biological techniques from the practical assessment and lectures to evaluate biomedical journal articles and how they can be applied to bench-to-clinic examples within selected topic areas. The extrapolation of this information will be presented as a group to the class. Groups will be provided with example papers with the expectation of them finding additional papers through journal searches via the library website ensuring students can perform literature searches. The Group Presentations will take place during tutorial classes in Week 11 and will contribute to 20% of the grade. Both practical report and group presentation will total 45%.

On successful completion you will be able to:

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Final Exam

Due: **Exam period**

Weighting: **40%**

The final exam will be composed of a mixture of questions that include MCQs, short and long answer questions. All content will be assessed.

On successful completion you will be able to:

- Describe the major cellular pathways that regulate biological processes and homeostasis.

- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology

## Delivery and Resources

### Technology Used

Active participation in the learning activities throughout the unit will generally require students to have access to a tablet, laptop or similar device. Students who do not own their own laptop computer may borrow one from the university library.

### Required Unit Materials

All students are required to wear closed shoes and a lab coat/gown to attend practical classes.

### Recommended Readings

Unit readings for this unit are available via the iLearn and university library website.

The prescribed textbook for this unit is

**Alberts, B. (2014) *Molecular Biology of the Cell* (6th Edition). Garland Science**

Other recommended texts (available at the library)

1. Alberts, B (2014) *Essential Cell Biology* (4th Edition) Garland Science.
2. Weinberg, R.A. (2014) *The Biology of Cancer* (2nd Edition) Garland Science.
3. Marks, F. (2009) *Cellular Signal Processing: An Introduction to the Molecular Mechanisms of Signal Transduction*. Garland Science .
4. Zlatanova, J (2016) *Molecular Biology: Structure and Dynamics of Genomes and Proteomes*. Garland Science

## Unit Schedule

Week/Date	Lecture	Topic	Delivery
1	1	Overview of the Unit. (ONLINE)	iLearn
31/07/2017		Principles of Cell Signaling I	
	2	Cell Signaling Basics (ONLINE)	
2			
7/08/2017	3	Cell cycle I	Lucinda McRobb
8/08/2017	4	Cell cycle II	
3			
14/08/2017	5	DNA damage and repair	Lucinda McRobb

Week/Date	Lecture	Topic	Delivery
15/08/2017	6	DNA damage response in human disease	
4			
21/08/2017	7	Oncogene Addiction	Esther Lim
22/08/2017	8	MAPK pathway	
5			
28/08/2017	9	Cytoskeleton I	Russell Diefenbach
29/08/2017	10	Defects in Cytoskeleton	
6			
4/09/2017	11	Transcription regulation and RNA processing	Prachi Mehta
5/09/2017	12	Translational regulation	
7			
11/09/2017	13	Protein Metabolism	Albert Lee
12/09/2017	14	Protein Metabolism Disorders	
		RECESS	
		RECESS	
8		Techniques in Biology (ONLINE)	iLearn - Open from Week 5
2/10/2017	15	From Basic to Translational Science	Rae-Anne Hardie
3/10/2017	16	Basic Principles of Pharmacology	Marina Santiago
9			
9/10/2017	17	Mitochondrial Dynamics	Joanne Lind
10/10/2017	18	Mitochondrial Dynamics and Dysfunction	
10			
16/10/2017	19	Cell survival pathways (UPS and autophagy)	Shu Yang
17/10/2017	20	Apoptosis and Necrosis	
11			
23/10/2017	21	Biomarkers	Edwin Lim
24/10/2017	22	Cell Adhesion and Interaction	Vivek Gupta
12			
30/10/2017	23	Neuroprotection and Microglia	Roger Chung

Week/Date	Lecture	Topic	Delivery
31/10/2017	24	Stem Cells and Cellular regeneration therapies	Claire Stevens
13			
6/11/2017	25	Animal Models	Adam Walker
7/11/2017	26	Revision	Albert Lee

## Learning and Teaching Activities

### Lectures

The lectures will cover topics and concepts in molecular and cellular biology, and the cellular pathways, processes and repair mechanisms affected during acute stress to help promote cellular survival. Examples and applications in cancer and neurodegenerative diseases will be covered to expand on these concepts. Each topic will be delivered by active scientific researchers from the Faculty of Medicine and Health Science (FMHS), and external researchers who specialise in that topic area

### Tutorial

The tutorials will be an interactive learning space where students are provided the opportunity to ask questions and solve problems specific to the topic delivered in lectures.

### Practical

Practical classes complement the course material and allow students to consolidate and apply both practical and conceptual elements to help shape their understanding. It is a requirement for all students to attend the practical classes in this unit with safety inductions completed and the correct personal protective equipment. Where a student does not attend practical classes, they will not pass this unit.

### Online activities

The online activities will be available prior to and following delivery of lectures and tutorials to enable students to self-assess and reflect on specific topic areas. It is expected that students contribute to online activities and make full use of resources to aide in their learning.

## 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](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](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.a>

[u/policy/docs/complaint\\_management/procedure.html](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](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/](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](http://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](http://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](http://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/](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

- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

#### Assessment tasks

- Report and Group Presentation
- 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

- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

#### Assessment tasks

- Report and Group Presentation
- 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

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

### Assessment tasks

- Report and Group Presentation
- 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

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical

- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment tasks

- Multiple Choice Quiz
- Report and Group Presentation
- 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

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Outline the different concepts, mechanisms, and checkpoints involved in disease
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment tasks

- Multiple Choice Quiz
- Report and Group Presentation
- 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

- Describe the major cellular pathways that regulate biological processes and homeostasis.
- Demonstrate an understanding of current topics in molecular and cell biology
- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment tasks

- Multiple Choice Quiz
- Report and Group Presentation
- 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

- Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment task

- Report and Group Presentation

## 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

- Demonstrate an understanding of current topics in molecular and cell biology
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment task

- Report and Group Presentation

## 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

- Demonstrate an understanding of current topics in molecular and cell biology
- Extract scientific information from publications, critically and collaboratively analyse and communicate findings in a verbal and written context.

## Assessment task

- Report and Group Presentation

## Changes from Previous Offering

This is a new unit being offered exclusively to B Clinical Science students for the first time in 2017.

## Changes since First Published

Date	Description
13/07/2017	Minor change added one lecturer to the unit delivery schedule.