



# MEDI3200

## Translational Biology and Genomics

Session 1, In person-scheduled-weekday, North Ryde 2023

*Macquarie Medical School*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff  
Unit Convenor, Lecturer and Tutor  
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Contact via email

Consultation by appointment

Course Director

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Contact via email

Credit points

10

Prerequisites

140cp at 1000 level or above including [(CBMS104 or BMOL1001) and (MEDI219 or MEDI2200)] or [(CBMS107 or CHEM1001) and (BIOL206 or BIOL2110) and (CBMS202 or BMOL2401) and (MEDI2201)]

Corequisites

Co-badged status

Unit description

This unit represents the final unit in the Biochemistry stream of units within the Bachelor of Clinical Science. Key concepts in genetics, cell biology and biochemistry, which are fundamental to our understanding of human biology, diseases and medicine are examined. You will learn about signal transduction, cytoskeletal dynamics, mitochondrial dysfunction, protein metabolism, stem cells and molecular targeted therapies. You will explore cellular pathways and processes involved in cellular homeostasis, and perturbations and defects that lead to disease (e.g. cancer and neurodegenerative disorders). You will participate in practical classes that complement the lecture series and allow you to consolidate and apply conceptual elements to help shape your understanding. You will be required to use laboratory techniques including 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:

**ULO1:** Describe the major cellular pathways that regulate biological processes and homeostasis.

**ULO2:** Outline the different concepts, mechanisms, and checkpoints involved in cancer and neurodegenerative diseases.

**ULO3:** Evaluate the current topics in molecular and cellular biology and genomics.

**ULO4:** Design and carry out experiments to characterise and measure a range of cellular processes and consolidate aspects of theory and practical.

**ULO5:** 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 Assessment Policy](#).

All final grades are determined by a grading committee, in accordance with the Macquarie University Assessment Policy, and are not the sole responsibility of the Unit Convenors.

Students will be awarded a final grade and a mark which must correspond to the grade descriptors specified in the [Assessment Procedure](#) (clause 128).

To pass this unit, students must demonstrate sufficient evidence of achievement of the learning outcomes, meet any ungraded requirements, and achieve a final mark of 50 or better.

Further details for each assessment task will be available on iLearn.

## Late Submission

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11.55 pm. A one-hour grace period is provided to students who experience a technical concern.

For example:

| Number of days (hours) late | Total possible marks | Deduction | Raw mark | Final mark |
|-----------------------------|----------------------|-----------|----------|------------|
| 1 day (1-24 hours)          | 100                  | 5         | 75       | 70         |
| 2 days (24-48 hours)        | 100                  | 10        | 75       | 65         |

| Number of days (hours) late | Total possible marks | Deduction | Raw mark | Final mark |
|-----------------------------|----------------------|-----------|----------|------------|
| 3 days (48-72 hours)        | 100                  | 15        | 75       | 60         |
| 7 days (144-168 hours)      | 100                  | 35        | 75       | 40         |
| >7 days (>168 hours)        | 100                  | -         | 75       | 0          |

For any late submissions of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

## Special Consideration

If you are unable to complete an assessment task on or by the specified date due to circumstances that are unexpected, unavoidable, significantly disruptive and beyond your control, you may apply for special consideration in accordance with the [Special Consideration Policy](#). Applications for special consideration must be supported by appropriate evidence and submitted via [ask.mq.edu.au](http://ask.mq.edu.au).

## Assessment Tasks

| Name  | Weighting | Hurdle | Due           |
|---|-----------|--------|---------------|
| <a href="#">Ongoing Weekly Quizzes</a>            | 15%       | No     | Ongoing       |
| <a href="#">Laboratory Report and Assignments</a> | 35%       | No     | Week 7, 9, 13 |
| <a href="#">Final examination</a>                 | 50%       | No     | Exam period   |

## Ongoing Weekly Quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Ongoing**

Weighting: **15%**

Weekly multiple choice and short answer quizzes to assess lecture content.

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 cancer and

neurodegenerative diseases.

- Evaluate the current topics in molecular and cellular biology and genomics.

## Laboratory Report and Assignments

Assessment Type <sup>1</sup>: Lab report

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **Week 7, 9, 13**

Weighting: **35%**

A three part assessment that includes (1) the group submission of a short scientific report that contextualises the experimental observations and results acquired during practical classes; (2) submission of an individual bioinformatics assignment; and (3) submission of an individual laboratory report that documents accurately and comprehensively all work undertaken within the practical classes.

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 cancer and neurodegenerative diseases.
- Evaluate the current topics in molecular and cellular biology and genomics.
- 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 examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **Exam period**

Weighting: **50%**

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 cancer and neurodegenerative diseases.
  - Evaluate the current topics in molecular and cellular biology and genomics.
  - 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.
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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## 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

**Lodish, H (2021) *Molecular Cell Biology* (9th Edition) Macmillan Learning OR**

**Alberts, B (2022) *Molecular Biology of the Cell* (7th Edition). W W Norton & Company**

Other recommended texts that are available at the library

1. Alberts, B. (2014) *Molecular Biology of the Cell* (6th Edition). Garland Science
2. Alberts, B (2014) *Essential Cell Biology* (4th Edition) Garland Science
3. Weinberg, R.A. (2014) *The Biology of Cancer* (2nd Edition) Garland Science.

4. Marks, F. (2009) *Cellular Signal Processing: An Introduction to the Molecular Mechanisms of Signal Transduction*. Garland Science .
5. Zlatanova, J (2016) *Molecular Biology: Structure and Dynamics of Genomes and Proteomes*. Garland Science

## Unit Schedule

| Week | Lecture Topic   | Delivered by            | Tutorial                        | Practical                        | Assessment                                    |
|------|---|-------------------------|---------------------------------|----------------------------------|---|
| 1    | Overview, Cell Signaling Basics, Techniques in biology                        | Albert Lee/<br>iLearn   | Tutorial 1<br><b>(Stream A)</b> | Practical 1<br><b>(Stream B)</b> | Online Quiz                                   |
| 2    | Genetics, Genomics and Genetic Therapies                                      | Jenn Fifita             | Tutorial 1<br><b>(Stream B)</b> | Practical 1<br><b>(Stream A)</b> | Online Quiz                                   |
| 3    | Cell Cycle dysregulation in cancer  | Lucinda<br>McRobb       | Tutorial 2<br><b>(Stream A)</b> | Practical 2<br><b>(Stream B)</b> | Online Quiz                                   |
| 4    | DNA damage and repair   | Lucinda<br>McRobb       | Tutorial 2<br><b>(Stream B)</b> | Practical 2<br><b>(Stream A)</b> | Online Quiz                                   |
| 5    | Signaling pathways in health and disease                                      | Esther Lim              | Tutorial 3<br><b>(Stream A)</b> | Practical 3<br><b>(Stream B)</b> | Online Quiz                                   |
| 6    | Apoptosis and Necrosis Cell survival pathways (UPS and autophagy)             | Albert Lee/<br>Shu Yang | Tutorial 3<br><b>(Stream B)</b> | Practical 3<br><b>(Stream A)</b> | Online Quiz                                   |
| 7    | Transcription regulation, RNA processing and Transcriptomics in human disease | Albert Lee              | Tutorial 4<br><b>(Stream A)</b> | Practical 4<br><b>(Stream B)</b> | Online Quiz &<br>Bioinformatics<br>Assignment |
|      | RECESS  |                         |                                 |                                  |   |
| 8    | Protein Metabolism and Proteomics   | Albert Lee              | Tutorial 4<br><b>(Stream B)</b> | Practical 4<br><b>(Stream A)</b> |   |
| 9    | Mitochondrial dysfunction and antioxidant therapies                           | Albert Lee              | Tutorial 5<br><b>(Stream A)</b> | Practical 5<br><b>(Stream B)</b> | Group Lab Report                              |
| 10   | Transgenic animals  | Marco<br>Morsch         | Tutorial 5<br><b>(Stream B)</b> | Practical 5<br><b>(Stream A)</b> |   |
| 11   | Neuroprotection and Microglia Stem Cells and Regeneration Therapies           | Roger<br>Chung          | Tutorial 6<br><b>(Stream A)</b> | Practical 6<br><b>(Stream B)</b> |   |
| 12   | Translating basic discoveries to pharma and clinic                            | Albert Lee              | Tutorial 6<br><b>(Stream B)</b> | Practical 6<br><b>(Stream A)</b> |   |
| 13   | Revision  | Albert Lee              | Revision                        |                                  | Lab book                                      |

## Policies and Procedures

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

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

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

## The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)



- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

## Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

## 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.

## Inclusion and Diversity

Social inclusion at Macquarie University is about giving everyone who has the potential to benefit from higher education the opportunity to study at university, participate in campus life and flourish in their chosen field. The University has made significant moves to promote an equitable, diverse and exciting campus community for the benefit of staff and students. It is your responsibility to contribute towards the development of an inclusive culture and practice in the areas of learning and teaching, research, and service orientation and delivery. As a member of the Macquarie University community, you must not discriminate against or harass others based on their sex, gender, race, marital status, carers' responsibilities, disability, sexual orientation, age, political conviction or religious belief. All staff and students are expected to display

appropriate behaviour that is conducive to a healthy learning environment for everyone.

## Professionalism

In the Faculty of Medicine, Health and Human Sciences, professionalism is a key capability embedded in all our courses.

As part of developing professionalism, **students are expected to attend all small group interactive sessions**, including clinical, practical, laboratory, work-integrated learning (e.g., PACE placements), and team-based learning activities. Some learning activities are recorded (e.g., face-to-face lectures), however you are encouraged to avoid relying upon such material as they do not recreate the whole learning experience and technical issues can and do occur. As an adult learner, we respect your decision to choose how you engage with your learning, but we would remind you that the learning opportunities we create for you have been done so to enable your success, and that by not engaging you may impact your ability to successfully complete this unit. We equally expect that you show respect for the academic staff who have worked hard to develop meaningful activities and prioritise your learning by communicating with them in advance if you are unable to attend a small group interactive session.

Another dimension of professionalism is having respect for your peers. It is the right of every student to learn in an environment that is free of disruption and distraction. Please arrive to all learning activities on time, and if you are unavoidably detained, please join the activity as quietly as possible to minimise disruption. Phones and other electronic devices that produce noise and other distractions must be turned off prior to entering class. Where your own device (e.g., laptop) is being used for class-related activities, you are asked to close down all other applications to avoid distraction to you and others. Please treat your fellow students with the utmost respect. If you are uncomfortable participating in any specific activity, please let the relevant academic know.