



MEDI2301

Cellular and Molecular Neuroscience

Session 2, In person-scheduled-weekday, North Ryde 2024

Macquarie Medical School

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General Information

Unit convenor and teaching staff

Unit Convener and Lecturer

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Contact via email

Consultation by appointment

Practical coordinator and Major Lead

Thomas Fath

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Contact via email

Consultation by appointment

Credit points

10

Prerequisites

COGS100 or COGS1000 or HLTH108 or ANAT1001 or BIOL115 or BIOL1110

Corequisites

Co-badged status

Unit description

In this unit, you will explore the molecular and cellular mechanisms underlying neuroscience, focusing on the structure and functions of neurons and glial cells in the peripheral and central nervous systems. You will learn the role of ion channels, receptors, and neurotransmitters, the electrical properties of neurons, neuropharmacology, relevant technologies in this field, and diseases affecting the nervous system.

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: Explain the structure and function of neurons and non-neuronal cells of the nervous system.

ULO2: Identify sub-cellular compartments in neurons and how they are involved in the regulation of neuronal function.

ULO3: Describe experimental techniques for studying cell function in the nervous system.

ULO4: Explain pathogenic mechanisms in the injured and diseased nervous system at a molecular and cellular level.

ULO5: Discuss centrally acting drugs and their targets at a molecular and cellular level.

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 Convenor.

Students will be awarded a final grade and a mark, which must correspond to the grade descriptors specified in the [Assessment Procedure](#) (clause 127).

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

Late Submissions

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 to 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 11.55pm. A 1-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
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

Late submission of time sensitive tasks, such as timetabled tests/exams, scheduled performance assessments/presentations, scheduled practical assessments/labs, will be addressed by the unit convenor in a Special consideration application.

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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Mid-session exam	25%	No	Week 7
Lab book	15%	No	Week 11
Social media carousel	20%	No	Week 13
End-of-session Exam	40%	No	Exam Period

Mid-session exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 10 hours

Due: **Week 7**

Weighting: **25%**

Written examination assessing all unit content delivered to this point.

On successful completion you will be able to:

- Explain the structure and function of neurons and non-neuronal cells of the nervous system.
- Identify sub-cellular compartments in neurons and how they are involved in the regulation of neuronal function.
- Explain pathogenic mechanisms in the injured and diseased nervous system at a molecular and cellular level.
- Discuss centrally acting drugs and their targets at a molecular and cellular level.

Lab book

Assessment Type ¹: Lab book

Indicative Time on Task ²: 6 hours

Due: **Week 11**

Weighting: **15%**

Lab book recording experimental activities carried out during practical classes.

On successful completion you will be able to:

- Explain the structure and function of neurons and non-neuronal cells of the nervous system.
- Identify sub-cellular compartments in neurons and how they are involved in the regulation of neuronal function.
- Describe experimental techniques for studying cell function in the nervous system.

Social media carousel

Assessment Type ¹: Media presentation

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **20%**

Social media carousel demonstrating understanding of selected topics in molecular and cellular neuroscience.

On successful completion you will be able to:

- Explain the structure and function of neurons and non-neuronal cells of the nervous system.
- Identify sub-cellular compartments in neurons and how they are involved in the regulation of neuronal function.
- Explain pathogenic mechanisms in the injured and diseased nervous system at a molecular and cellular level.
- Discuss centrally acting drugs and their targets at a molecular and cellular level.

End-of-session Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 22 hours

Due: **Exam Period**

Weighting: **40%**

Formal exam assessing all unit content held in the university exam period

On successful completion you will be able to:

- Explain the structure and function of neurons and non-neuronal cells of the nervous system.
- Identify sub-cellular compartments in neurons and how they are involved in the regulation of neuronal function.
- Describe experimental techniques for studying cell function in the nervous system.
- Explain pathogenic mechanisms in the injured and diseased nervous system at a molecular and cellular level.
- Discuss centrally acting drugs and their targets at a molecular and cellular level.

¹ 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.

² 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

As a student enrolled in this unit, you will engage in a range of online and face-to-face learning activities, including online lectures and tutorials, where you will have the opportunity to discuss the material with each Lecturer. There are also practical classes to aid your learning.

A useful textbook for MEDI2301 is *Neuroscience* by Dale Purves et al. (7th Edition, 2023). The textbook is available as e-books accessed through the library or Leganto. Lecturers may also draw on material from scientific publications that will be referred to.

Technology Used

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

Unit Schedule

Topic/Theme	Learning Activities
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Week 1	Introduction to cellular and molecular neuroscience, the properties of neurons and glia	On-line lecture and tutorial
Week 2	Unique features of neurons	On-line lecture and tutorial
Week 3	Neurotransmitters and neuropharmacology	On-line lecture and tutorial
Week 4	Methods for studying the nervous system	On-line lecture and practical
Week 5	Sub-cellular compartments in neurons	On-line lecture and practical
Week 6	Synapses	On-line lecture and tutorial
Week 7	Neuron-glia communication	On-line lecture and tutorial
Week 8	Mid-semester exam	
Week 9	Molecular mechanisms of disease - neurodegeneration and nerve regeneration	On-line lecture and practical
Week 10	Molecular mechanisms of disease - Alzheimer's disease	On-line lecture and practical
Week 11	Molecular mechanisms of disease - Amyotrophic Lateral Sclerosis/Motor Neuron Disease	On-line lecture and tutorial
Week 12	Animal disease models	On-line lecture and tutorial
Week 13	Summary	

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 or if you are a Global MBA student contact 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/.

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.

Unit information based on version 2024.02 of the [Handbook](#)