# MEDI2301
## Cellular and Molecular Neuroscience

Session 2, In person-scheduled-weekday, North Ryde 2023

*Macquarie Medical School*

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General Information

Unit convenor and teaching staff
Unit Convenor
Thomas Fath
thomas.fath@mq.edu.au
Contact via email
Fridays, 9-10am

Unit Co-Convenor
Shu Yang
shu.yang@mq.edu.au
Contact via email
Level 1, 75 Talavera Rd
Monday, Tuesday, Thursdays 11-2.30

Credit points
10

Prerequisites
COGS100 or COGS1000 or HLTH108 or ANAT1001 or BIOL115 or BIOL1110

Corequisites

Co-badged status

Unit description
In the first part of this unit you will cover various topics, including the morphogenesis and function of neurons and glial cells in the peripheral and central nervous system. A particular emphasis will be the discussion of the structure and function of specialised micro-compartments in neuronal cells, the generation of electrical signals in neurons, the structure, properties and function of ion channels, receptors and transporters and chemical transmission of signals at nerve cell connections. In the second part of this unit, you will focus on how neuronal function is disrupted in disease and which technologies are available to interrogate functional aspects of the nervous system under physiological conditions and in the diseased nervous system. This will include an in depth discussion of modern experimental technologies in cellular physiology as well as the application of molecular biology techniques to manipulate and explore the function of molecules in 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 of cell function in the nervous system.

**ULO4:** Explain pathomechanisms in the injured and diseased nervous system at a 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 128).

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.

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

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 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 11.55pm. A 1-hour grace period is provided to students who experience a technical concern.

For example:

<table>
<thead>
<tr>
<th>Number of days (hours) late</th>
<th>Total Possible Marks</th>
<th>Deduction</th>
<th>Raw mark</th>
<th>Final mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day (1-24 hours)</td>
<td>100</td>
<td>5</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>2 days (24-48 hours)</td>
<td>100</td>
<td>10</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>3 days (48-72 hours)</td>
<td>100</td>
<td>15</td>
<td>75</td>
<td>60</td>
</tr>
</tbody>
</table>
Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online quizzes</td>
<td>20%</td>
<td>No</td>
<td>Continuous from Week 2 till Week 10</td>
</tr>
<tr>
<td>Mid-session exam</td>
<td>30%</td>
<td>No</td>
<td>Week 7</td>
</tr>
<tr>
<td>Group presentation</td>
<td>20%</td>
<td>No</td>
<td>Week 11</td>
</tr>
<tr>
<td>End-of-session Exam</td>
<td>30%</td>
<td>No</td>
<td>Exam Period</td>
</tr>
</tbody>
</table>

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.

Assessment Tasks

Online quizzes

Assessment Type: Participatory task
Indicative Time on Task: 5 hours
Due: Continuous from Week 2 till Week 10
Weighting: 20%

Quizzes assessing understanding of unit content.

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 of cell function in the nervous system.
• Explain pathomechanisms in the injured and diseased nervous system at a cellular level.

Mid-session exam
Assessment Type 1: Examination
Indicative Time on Task 2: 10 hours
Due: Week 7
Weighting: 30%

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.
• Describe experimental techniques for studying of cell function in the nervous system.
• Explain pathomechanisms in the injured and diseased nervous system at a cellular level.

Group presentation
Assessment Type 1: Presentation
Indicative Time on Task 2: 15 hours
Due: Week 11
Weighting: 20%

Group presentation of assigned research articles assessing lecture contents and application of experimental techniques from the practicals.

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 of cell function in the nervous system.
• Explain pathomechanisms in the injured and diseased nervous system at a cellular level.

End-of-session Exam
Assessment Type 1: Examination
Indicative Time on Task 2: 10 hours
Due: Exam Period
Weighting: 30%

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 of cell function in the nervous system.
• Explain pathomechanisms in the injured and diseased nervous system at a 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 readings, online modules, tutorials, practicals, videos and lectures. Details can be found on the iLearn site for this unit.

Recommended Readings
**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 own laptop computer may borrow one from the university library.

**Unit Schedule**

<table>
<thead>
<tr>
<th>Topic/Theme</th>
<th>Learning Activities</th>
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<tbody>
<tr>
<td>Week 1  Unit Overview – Glial Cells</td>
<td>Lectures, Tutorial</td>
</tr>
<tr>
<td>Week 2  Methods in Neuroscience</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 3  Neuronal Polarisation</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 4  Neuronal Cell Architecture</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 5  Local Protein Synthesis</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 6  Protein Trafficking</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 7  Synaptic Plasticity</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 8  Nerve Regeneration and Neuropathology</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 9  Communication between Neurons and Environment</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 10 Molecular Mechanisms of Disease</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 11 Molecular Mechanisms of Disease</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 12 Molecular Mechanisms of Disease</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
<tr>
<td>Week 13 Revision</td>
<td>Lectures, Tutorial, Practical</td>
</tr>
</tbody>
</table>

*Note: You will attend practicals only in weeks with odd numbers OR even numbers, dependent on which group you are enrolled in.*

**Policies and Procedures**

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:
Students seeking more policy resources can visit Student 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) 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
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, practical, laboratory, 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. 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 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.