



MEDI2004

Pharmacology Fundamentals

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, Lecturer, Tutor and Course Director

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Credit points

10

Prerequisites

30cp at 1000 level or above including (BMOL1001 or CBMS104 or CBMS107 or CHEM1001)

Corequisites

Co-badged status

Unit description

This unit will introduce the fundamental principles of drug action. You will study key concepts relating to drug disposition (pharmacokinetics) and how drugs act on the human body (pharmacodynamics). You will build your knowledge of chemical substances, from both outside and inside the body, and how they influence human health and disease. You will explore the mechanism of action and disposition of some commonly-used groups of drugs, as well as reasons for variability in individual drug responses. Learning activities will include interactive tutorials, online activities, and lectures. Topics covered in this unit will help you to integrate knowledge of molecular biology, chemistry, biochemistry and physiology with the science of drugs.

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: Apply the principles of pharmacokinetics in describing drug entry, distribution, metabolism and removal from the body.

ULO2: Identify major drug targets and mechanisms of drug action at the molecular level.

ULO3: Use pharmacodynamic principles to relate the concept of agonist and antagonist to the quantification of a drug effect.

ULO4: Describe the mechanism of action, adverse effects and drug interactions of some commonly used therapeutic agents.

ULO5: Outline the principles involved in individual variability of drug response and interactions between drugs.

ULO6: Effectively communicate your knowledge of pharmacology at an individual level and within a team environment.

ULO7: Discuss key stages of drug development including the regulatory process in Australia

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 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 11.55pm. 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 |

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

| Name | Weighting | Hurdle | Due |
|---------------------------------|-----------|--------|----------------------|
| Short quiz | 30% | No | Weeks 4, 6, 8 and 12 |
| Group Role Play | 20% | No | Week 8 |
| Final Exam | 50% | No | Exam period |

Short quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 20 hours

Due: **Weeks 4, 6, 8 and 12**

Weighting: **30%**

A series of four short quizzes using a combination of questions to assess lecture and tutorial material.

On successful completion you will be able to:

- Apply the principles of pharmacokinetics in describing drug entry, distribution, metabolism and removal from the body.
- Identify major drug targets and mechanisms of drug action at the molecular level.
- Use pharmacodynamic principles to relate the concept of agonist and antagonist to the quantification of a drug effect.
- Describe the mechanism of action, adverse effects and drug interactions of some commonly used therapeutic agents.
- Outline the principles involved in individual variability of drug response and interactions between drugs.
- Effectively communicate your knowledge of pharmacology at an individual level and within a team environment.
- Discuss key stages of drug development including the regulatory process in Australia

Group Role Play

Assessment Type ¹: Simulation/role play

Indicative Time on Task ²: 20 hours

Due: **Week 8**

Weighting: **20%**

Role-play activity that applies the knowledge acquired in lectures and tutorials.

On successful completion you will be able to:

- Apply the principles of pharmacokinetics in describing drug entry, distribution, metabolism and removal from the body.
- Identify major drug targets and mechanisms of drug action at the molecular level.
- Use pharmacodynamic principles to relate the concept of agonist and antagonist to the quantification of a drug effect.
- Describe the mechanism of action, adverse effects and drug interactions of some commonly used therapeutic agents.
- Outline the principles involved in individual variability of drug response and interactions between drugs.
- Effectively communicate your knowledge of pharmacology at an individual level and within a team environment.

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Exam period**

Weighting: **50%**

Formal written exam using a combination of question types assessing content delivered across the session. This task is completed under examination conditions during the University examination period.

On successful completion you will be able to:

- Apply the principles of pharmacokinetics in describing drug entry, distribution, metabolism and removal from the body.
- Identify major drug targets and mechanisms of drug action at the molecular level.
- Use pharmacodynamic principles to relate the concept of agonist and antagonist to the quantification of a drug effect.
- Describe the mechanism of action, adverse effects and drug interactions of some commonly used therapeutic agents.
- Outline the principles involved in individual variability of drug response and interactions between drugs.
- Discuss key stages of drug development including the regulatory process in Australia

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 tutorials, online modules, videos and lectures. Details can be found on the iLearn site for this unit.

Recommended Readings

Unit readings are available via Leganto and the university library website.

The recommended textbook for this unit is:

1. Rang and Dale's Pharmacology, 9th Edition. H. P. Rang, J. M. Ritter, R. J. Flower, and G. Henderson, (Elsevier 2020)

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

Proposed schedule. Note that due to unforeseen events, changes may happen.

** online at specified time - check the [timetable](#) for the workshop

| | Topic | Learning activities | Assessment task |
|---------------|---|---|---|
| Week 1 | MEDI2004 Introductory Lecture Introduction to Pharmacology (Pharmacokinetics and Pharmacodynamics) | Lecture (face-to-face and online module) and tutorial | |
| Week 2 | Drug absorption and distribution | Lectures (online modules) and tutorial | |
| Week 3 | Drug elimination: metabolism and excretion Drug elimination: pharmacokinetics parameters | Lectures (online modules) and tutorial | |
| Week 4 | Introduction to Pharmacodynamics Quantification of drug effect | Lectures (online modules) and tutorial | AT1 - Quiz 1** |
| Week 5 | Drug targets - Receptors, Enzymes and Transporters | Lectures (online modules) and tutorial | |
| Week 6 | Ion Channels and diseases Drug safety: Poisoning, adverse effects and drug interaction | Lectures (online modules) and tutorial | AT1 - Quiz 2** |
| Week 7 | Small molecules vs biological drugs, and gene therapy Pharmacogenomics (Individual variation) | Lectures (online modules) and tutorial | |
| Week 8 | Native Plants and Traditional Aboriginal Medicines | Lectures (online modules) and tutorial | AT1 - Quiz 3** AT2 - Group Role play |

| | Topic | Learning activities | Assessment task |
|--------------------|--|--|------------------|
| Week 9 | Rational drug design, clinical trials and Placebo effect Drug regulation in Australia: TGA, drug schedule and PBS | Lectures (online modules) and tutorial | |
| Week 10 | Pharmacology of the Autonomic Nervous System Anti-inflammatory drugs - NSAIDs and corticosteroids | Lectures (online modules) and tutorial | |
| Week 11 | Lipid-lowering drugs Antihypertensives | Lectures (online modules) and tutorial | |
| Week 12 | Drugs and the respiratory system | Lecture (online module) and tutorial | AT1 - Quiz 4** |
| Week 13 | Clinical Pharmacology (no tutorial) | Lecture face-to-face (no tutorial) | |
| Exam period | | | AT3 - Final exam |

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.

Changes from Previous Offering

Group assessment was moved from week 9 to week 8. This aims to decrease clashes with other assessment tasks in the BClinSc core units. In addition, with the fresh studied content for the week 8 quiz, students may have a better performance in the Q&A session.

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 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.