



MOLS7211

Protein Discovery and Analysis

Session 1, Weekday attendance, North Ryde 2021

Archive (Pre-2022) - Department of Molecular Sciences

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Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Unit Convenor

Alison Rodger

alison.rodger@mq.edu.au

Contact via Email is preferred, alternatively 0426627077

6WW 302

Timetabled lecture hours, before and after classes by arrangement, other by arrangement.

Credit points

10

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This unit outlines molecular principles underlying today's developments in protein science and biomedical research. As well as detailing modern separation technologies, the course addresses structural biology, protein analysis and bioinformatics. Practices common in the biotechnology and pharmaceutical industries to isolate recombinant proteins are emphasized. Analysis methods are introduced in relation to proteomics, genomics and biochemical research. Molecular properties leading to the 3D shape of proteins are detailed and contemporary structure methods outlined.

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: Design appropriate procedures for isolating and handling proteins

ULO2: Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro

ULO3: Utilise contemporary web tools for protein analysis

ULO4: Describe protein topology forms and architectures, and recognise how these are

encoded within a primary sequence

ULO5: Extract and interpret information from literature sources concerning proteins

General Assessment Information

Details of how assessments operate may be found in iLearn.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|-----------|--------|--|
| <u>In class quizzes</u> | 40% | No | Weeks 5, 10, 12 at beginning of second lecture |
| <u>Protein Production Practical</u> | 15% | No | 4 pm Friday week 8 |
| <u>"Pet Protein" Model and Seminar</u> | 20% | No | Week 13 during your assigned class |
| <u>"Pet Protein" Sequence Analysis & Purification</u> | 15% | No | 4 pm Friday week 7 end of class |
| <u>Molecular graphics</u> | 10% | No | 4 pm Friday week 11 |

In class quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 25 hours

Due: **Weeks 5, 10, 12 at beginning of second lecture**

Weighting: **40%**

Short answer quizzes for continual assessment

On successful completion you will be able to:

- Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro
- Describe protein topology forms and architectures, and recognise how these are encoded within a primary sequence

Protein Production Practical

Assessment Type ¹: Lab report

Indicative Time on Task ²: 10 hours

Due: **4 pm Friday week 8**

Weighting: **15%**

Follow the procedures for preparation and isolation of a protein, and analyse the characteristics of your sample.

On successful completion you will be able to:

- Design appropriate procedures for isolating and handling proteins
- Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro
- Utilise contemporary web tools for protein analysis

“Pet Protein” Model and Seminar

Assessment Type ¹: Creative work

Indicative Time on Task ²: 20 hours

Due: **Week 13 during your assigned class**

Weighting: **20%**

Research the literature concerning the 3D structure and structure determination method for your assigned protein. Construct a model that shows the three-dimensional shape of this macromolecule, and present this in a class presentation.

On successful completion you will be able to:

- Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro
- Utilise contemporary web tools for protein analysis
- Describe protein topology forms and architectures, and recognise how these are encoded within a primary sequence
- Extract and interpret information from literature sources concerning proteins

"Pet Protein" Sequence Analysis & Purification

Assessment Type ¹: Case study/analysis

Indicative Time on Task ²: 15 hours

Due: **4 pm Friday week 7 end of class**

Weighting: **15%**

Each student will be assigned a protein of industrial/medical importance as a case study throughout this Unit. You will conduct a literature search to discover the purification procedures historically used to isolate this protein, and report on the background chemistry underlying these

procedures.

On successful completion you will be able to:

- Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro
- Utilise contemporary web tools for protein analysis
- Extract and interpret information from literature sources concerning proteins

Molecular graphics

Assessment Type ¹: Lab report

Indicative Time on Task ²: 10 hours

Due: **4 pm Friday week 11**

Weighting: **10%**

You will use molecular graphics (program PyMOL) to view the 3D structure of a GTP-ase protein to understand its binding and function.

On successful completion you will be able to:

- Demonstrate a chemical understanding of proteins (gene products), in vivo and in vitro
- Describe protein topology forms and architectures, and recognise how these are encoded within a primary sequence
- Extract and interpret information from literature sources concerning proteins

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

This unit has a diverse range of carefully designed activities to enable you to achieve the learning outcomes. It is a Masters-level unit which can only successfully be completed if you take responsibility for your own learning.

Lectures: the lecture content is provided on-line. There will be a Q&A session scheduled each

week for you to ask and answer questions. If you can't answer each other's questions, the unit convenor may be able to. If not, 'homework' for the next session will be to answer the unanswered questions. Your participation in the Q&A sessions is not directly assessed, however, your ability to discuss concepts verbally will directly enhance your written assessed work. Please come to the Q&A sessions prepared to show your face and talk. The Convenor will note who contributes and it will help her understand how you think when she reads your submitted assessments.

You will only really benefit from the Q&A sessions if you have done the pre-listening and ideally some extra reading. Your success in this unit will be directly proportional to the effort you put into it. For nearly all of you, your enjoyment will also increase with your effort.

Quizzes: the quizzes have been designed to remind you to keep up to date with material in this unit as it is all about building levels of experience.

Workshops and practicals: Molecular Sciences is a practical-based subject but also requires increasing amounts of data analysis, modelling and literature reading. The tasks have been designed to help you gain these skills. It is generally the case that the independence required for this unit feels intimidating at first but once you launch yourself it will be very satisfying. A pet protein will be assigned to you but if you have a passion for another one please discuss this with the unit convenor. The key things being assessed here are your ability to undertake technical tasks (experimental and theoretical) and to communicate the outcomes.

Some students are unable to be present on campus and will join their groups remotely. If you need to take this unit remotely, you will have to convince the unit convenor that your circumstances are such that this is the only possibility. As remote learning in this unit is much less effective than face-to-face learning, a very convincing reason will be required.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.s.mq.edu.au\)](https://policies.s.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](#)
- [Grade Appeal Policy](#)
- [Complaint Management 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

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) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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

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

If you are a Global MBA student contact globalmba.support@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/.

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 since First Published

| Date | Description |
|------------|---|
| 01/02/2021 | Changed timing of quiz to beginning of the lecture (following Bridget's practice) |