



# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** Molecular Cell Biology

**Unit ID:** SCMOL3001

**Credit Points:** 15.00

**Prerequisite(s):** (SCBCH2001)

**Co-requisite(s):** Nil

**Exclusion(s):** (SCMED2031)

**ASCED:** 010901

## Description of the Unit:

The unit examines the pathways by which cells receive external information and process this into specific biochemical responses. We begin with a survey of different mechanisms of cellular signalling and their roles in `normal` cellular activities and overall homeostasis. A diverse set of cellular processes is studied and the normal control mechanisms highlighted. This is followed by investigation of the dysfunction of signalling mechanisms in several disease states. The unit will also explore the use of advanced recombinant DNA technologies in research and diagnostics. The latest methods for investigating gene and protein function, gene therapy, virus detection and typing, recombinant vaccine production and personalized medicine will be explored.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

## Work Experience:

No work experience

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

**Course Level:**

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	■	■	■	■
Intermediate	■	■	■	■	■	■
Advanced	■	■	✓	■	■	■

### Learning Outcomes:

#### Knowledge:

- K1.** Describe the function of a range of cell-cell communication processes.
- K2.** Describe how signalling events regulate the normal function of the healthy body.
- K3.** Recognise the role of signalling dysfunction in a range of pathological states.
- K4.** Explain the molecular basis of a wide range of diagnostic and research techniques.

#### Skills:

- S1.** Develop scientific problem solving and investigation skills.
- S2.** Devise strategies to search for and critically analyse relevant scientific literature.
- S3.** Demonstrate proficiency in the interpretation of data acquired by molecular biological techniques.

#### Application of knowledge and skills:

- A1.** Appraise current scientific problems in industry, medicine and research and devise strategies to solve them.
- A2.** Critically evaluate and compare approaches to a particular scientific or industrial problem.

#### Unit Content:

- Structure and function of eukaryotic cells and organelles review.
- Trafficking between cellular compartments review.
- Cell signalling and signal transduction.
- Advanced regulation of gene expression: RNAi, epigenetics.
- Endocrine control of cellular processes.
- The cell cycle, apoptosis and cell death.
- Pathogenesis associated with dysfunctional states.
- Advanced molecular diagnostics: including high throughput sequencing, transcriptome analysis RT-PCR and microarray technology.
- Proteomics and metabolomics.

#### FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: <ul style="list-style-type: none"> <li>Using effective verbal and non-verbal communication</li> <li>Listening for meaning and influencing via active listening</li> <li>Showing empathy for others</li> <li>Negotiating and demonstrating conflict resolution skills</li> <li>Working respectfully in cross-cultural and diverse teams.</li> </ul>	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Creating a collegial environment</li> <li>Showing self-awareness and the ability to self-reflect</li> <li>Inspiring and convincing others</li> <li>Making informed decisions</li> <li>Displaying initiative</li> </ul>	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Reflecting critically</li> <li>Evaluating ideas, concepts and information</li> <li>Considering alternative perspectives to refine ideas</li> <li>Challenging conventional thinking to clarify concepts</li> <li>Forming creative solutions in problem solving.</li> </ul>	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>Collating, managing, accessing and using digital data securely</li> <li>Receiving and responding to messages in a range of digital media</li> <li>Contributing actively to digital teams and working groups</li> <li>Participating in and benefiting from digital learning opportunities.</li> </ul>	Not applicable	Not applicable
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>Committing to social responsibility as a professional and a citizen</li> <li>Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	Not applicable	Not applicable

**Learning Task and Assessment:**

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, S1, S2, A2	AT-1: Online Quizzes testing the retention, comprehension and application of unit lecture content. Online quizzes testing comprehension of scientific research articles related to unit content explored via tutorial work	Quizzes: Multiple choice, short answer questions and problems requiring application of knowledge (varied question types)	30-50%
K1, K3, S1, S3	AT-2: Comprehension of signalling mechanisms. Examine the detailed molecular effects of selected toxins and medicines on cells, organs and tissues.	Written and/or oral report.	20-30%
K1, K2, K3, K4, A1, A2	AT-3 Students will be examined on their knowledge and synthesis of understanding of all topics throughout semester.	Online Test (varied question types)	30-50%

### Adopted Reference Style:

APA ()

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)