BIOS 3001 ADVANCED CELL BIOLOGY

Credit Points 10

Legacy Code 300850

Coordinator Mark Jones (https://directory.westernsydney.edu.au/search/name/Mark Jones/)

Description Cells of the body are studied in the context of health and disease, including mechanisms by which cells respond to the environment and integrate in and around tissue. Fundamental cellular processes are discussed that are important in embryonic development, stem cells, haematology and cancer. This subject investigates the action of hormones, growth factors and morphogens; their receptors and signalling pathways and the cellular responses they trigger. This subject covers modern techniques in cell culture, tissue engineering, advanced microscopy and other modern experimental approaches that enable dynamic understanding of live cell function.

School Science

Discipline Biochemistry and Cell Biology

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) BIOS 2021 OR
BIOS 2014 OR
BIOS 2026 OR
BIOS 2020

Equivalent Subjects LGYA 6014 - Mammalian Cell Biology and Biotechnology BIOS 3011 - Cell Signalling

Incompatible Subjects LGYA 5857 - Cell Signalling and Molecular Immunology

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Describe detailed microscopic appearance of eukaryotic cells and their specialization, from stem cells to blood and tissue.
2. Explain the compartmentalization of molecules and their transport throughout the cell.
3. Explain the interrelationship of cells with their immediate environment including adjacent cells, the extra-cellular matrix, and the cytoskeleton.
4. Describe the molecular events, regulated by receptors and signal transduction pathways, cells activate following stimulation.
5. Describe the development of cells (e.g. haematopoiesis), their identification, morphology and function in the context of haematology.
6. Explain the detailed microscopic characterization of eukaryotic cells in blood and tissue, including the use of confocal microscopy and fluorescence correlation spectroscopy.
7. Demonstrate technical and interpretive skills for cell culturing, including cell characterization using advanced microscopy and image analysis.

Subject Content

The structure and function of membranes, organelles and the cell cytoskeleton.
Intracellular compartmentalization of molecules and their transport.
The interrelationship of cells with their immediate environment including adjacent cells, the extra-cellular matrix, and the cytoskeleton.
Cell communication through: Receptors - families, general properties; receptor-ligand binding studies and outcomes, and Signalling molecules - structural variety; functional classification.
Cell division including stem cells, the cell cycle, and its control and cell death.
The development of cells (e.g. haematopoiesis), their identification, morphology and function is investigated in the context of haematological and cell disorders and stem cell therapies.
The detailed microscopic characterization of eukaryotic cells in blood and tissue, including confocal microscopy and fluorescence correlation.
The development of technical and interpretative skills relevant to cell culture methods, cell characterisation through specific stains/probes, using advanced microscopy and image analysis techniques.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Project	3,000 words	30	N	Individual
Report	2,000 words	20	N	Individual
Final Examination	2 hours	50	Y	Individual

Teaching Periods