

## 521-212 Biochemical Regulation of Cell Function

<b>Credit Points:</b>	12.50
<b>Level:</b>	2 (Undergraduate)
<b>Dates &amp; Locations:</b>	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
<b>Time Commitment:</b>	Contact Hours: three x 1 hour lecture and one x 1 hour tutorial per week Total Time Commitment: 48 contact hours with an estimated total time commitment of 120 hours
<b>Prerequisites:</b>	<b>BSc students</b> 610101 Chemistry 1 and 610102 Chemistry 2 <b>BBiomed students</b> 610150 Chemistry for Biomedicine Other combinations of subjects that provide a similar background may be considered by the coordinator
<b>Corequisites:</b>	None
<b>Recommended Background Knowledge:</b>	<b>BSc students</b> Level 1 Biology is strongly recommended Biochemistry and Molecular Biology is strongly recommended. A biological practical subject such as Techniques in Molecular Science or equivalent is strongly recommended <b>BBiomed students</b> A biological practical subject such as Techniques in Molecular Science or equivalent is strongly recommended
<b>Non Allowed Subjects:</b>	Students cannot enrol in and gain credit for this subject if previously obtained credit for pre-2009 subject Biochemistry and Molecular Biology Part A or Biochemistry and Molecular Biology Part B.
<b>Core Participation Requirements:</b>	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.
<b>Coordinator:</b>	Dr Irene Stanley
<b>Subject Overview:</b>	In this subject the molecular basis of cell function and regulation is described. Subject content includes an introduction to biomembranes, macromolecular structures used to compartmentalize cellular processes. The lipid and glycoprotein composition of membranes are described and how they enable specific functions such as the transport of molecules and secretion of proteins. The molecules of the life are studied in the processes of the cell division, cell regulation and cell death (apoptosis). The role of large protein assemblies called the cytoskeleton in allowing cells to maintain their shape, to migrate and to transport molecules is explained. Nutrition and metabolism explores the dual rolls of diet in providing energy and structural precursors to maintain human health. Core energy pathways relating to carbohydrate, protein and lipid metabolism will be investigated as a means of generating energy. The crucial role of cholesterol in health and disease will be investigated. Hormonal regulation of metabolism and metabolic adaptations to fasting, starvation and in athletes will be covered. An introduction to the field of metabolic signal transduction considers the actions of hormones and their intracellular signalling pathways, critical to health and disease. The process of photosynthesis introduces how carbohydrates are made from carbon dioxide, using the energy of the sun. This is an elegant biochemical process which is fundamental to human existence.
<b>Objectives:</b>	By the end of the subject the student should understand the following:

	<ul style="list-style-type: none"> <li># The structure and function of biomembranes e.g. in transporting molecules into or out of the cell and in protein secretion.</li> <li># Cellular processes will be seen as the outcome of gene expression, regulation by factors within and external to cells. Such processes may result in a healthy cell or lead to apoptosis or cancer.</li> <li># The cytoskeleton and cytoskeletal proteins that allow cells to maintain their shape, to migrate and to transport molecules within the cell.</li> <li># The dual role of diet in providing energy and structural precursors for cells and to maintain human health.</li> <li># Core metabolic pathways for carbohydrates and proteins by which cells generate ATP.</li> <li># Photosynthesis as the crucial means by which plants generate carbohydrates from carbon dioxide, using the energy of the sun.</li> <li># Signal transduction and the actions of hormones and their intracellular signalling pathways, critical to health and disease.</li> </ul>
<b>Assessment:</b>	3 hour written exam held in examination period (70%), one 1 hour multichoice examination (10%), continuing computer based assessment (20%)
<b>Prescribed Texts:</b>	Nelson and Cox, Lehninger Principles of Biochemistry, 5th edn., 2008
<b>Breadth Options:</b>	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2009/D09">https://handbook.unimelb.edu.au/view/2009/D09</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2009/F04">https://handbook.unimelb.edu.au/view/2009/F04</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2009/A04">https://handbook.unimelb.edu.au/view/2009/A04</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2009/M05">https://handbook.unimelb.edu.au/view/2009/M05</a>)</li> </ul> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<p>On completion of this subject, students should have developed the following generic skills:</p> <ul style="list-style-type: none"> <li># think critically and organise knowledge, from consideration of the lecture material;</li> <li># learn to adopt new ideas, from participation in the lecture program; and</li> <li># plan effective work schedules and grow more confident in the synthesis of knowledge.</li> </ul>
<b>Notes:</b>	<p>This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course.</p> <p>Not available to students enrolled in the BBiomedSc.</p> <p>Students undertaking this subject will be expected to regularly access and internet-enabled computer</p>
<b>Related Course(s):</b>	<p>Bachelor of Agricultural Science          Bachelor of Agricultural Science          Bachelor of Animal Science and Management          Graduate Diploma in Biotechnology</p>