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INTRODUCTION

Biotechnology 632 covers the application of biotechnology as it is applied to therapeutic processes for clinical application. Biotechnology has been applied as a medical science since around 500 BC when the Chinese used mouldy soybean curd to treat boils, which are caused by bacteria such as *Staphylococcus*. More recently, life-saving treatments such as bone-marrow stem-cell transplants have become relatively common and the rapid rate of development in understanding tissue and organ growth and development is contributing to the development of therapies for a wide variety of health-related problems.

This unit explores existing therapies and the most recent developments in clinical therapy that have arisen from studies in biotechnology and are still under development. All have clear benefits for improvements in health-care, extending life, and extending or restoring activity, following illness or injury.

ESSENTIAL ADMINISTRATIVE INFORMATION

<table>
<thead>
<tr>
<th>Unit Title</th>
<th>Biotechnology 632</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Description</td>
<td>Biotechnology 632 is about applying biotechnology to keep people healthy and active, curing disease, reducing disability or suffering, and prolonging healthy life. Many processes are currently used in these roles and many more are in the later stages of development. This unit examines the remarkable developments and still more remarkable potential of biotechnology in medical practise.</td>
</tr>
<tr>
<td>Unit Study Package Number</td>
<td>310161</td>
</tr>
<tr>
<td>Unit Coordinator</td>
<td>Dr Keith Gregg</td>
</tr>
<tr>
<td>Teaching Area</td>
<td>Molecular Genetics and Biotechnology</td>
</tr>
<tr>
<td>Credit Value</td>
<td>25</td>
</tr>
<tr>
<td>Mode(s) of study</td>
<td>Internal</td>
</tr>
<tr>
<td>Co-, and Pre-requisites</td>
<td>Biotechnology 631 is recommended, but not essential.</td>
</tr>
<tr>
<td>Additional requirements</td>
<td>None.</td>
</tr>
<tr>
<td>Core Unit status</td>
<td>If you are taking this unit as a required (core) unit in your course of study, you may be terminated from your course of study if you fail this unit twice.</td>
</tr>
<tr>
<td>Result Type</td>
<td>Grade and Mark</td>
</tr>
<tr>
<td>Ancillary Fees and Charges</td>
<td>All fee information can be obtained through the Fees Centre. Visit <a href="http://www.fees.curtin.edu.au/index.cfm">http://www.fees.curtin.edu.au/index.cfm</a> for details.</td>
</tr>
<tr>
<td>Unit Website</td>
<td>You will be able to access the unit materials via FLECS Blackboard, through <a href="http://oasis.curtin.edu.au">http://oasis.curtin.edu.au</a></td>
</tr>
<tr>
<td>Faculty or School Website</td>
<td><a href="http://www.biomed.curtin.edu.au/">http://www.biomed.curtin.edu.au/</a></td>
</tr>
</tbody>
</table>
Tuition Schedule

International students NOTE: attendance at 90% or more of teaching sessions is a condition for the retention of many student visas.

Study Load

Lectures: Thursday: 11 a.m. – 1 p.m. 408.1502
Tutorials: Thursday: 8 a.m. – 10 a.m. 307.102

Teaching material will be available on FLECS Blackboard following lectures.

In addition to class attendance time and assignment preparation time, it is recommended that at least one hour of revision for each lecture’s question set be completed before attending the tutorial related to that lecture.

TEACHING STAFF

The lecturer and tutor for this unit and contact details are below:

<table>
<thead>
<tr>
<th>Your lecturer and tutor:</th>
<th>Dr Keith Gregg</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-mail:</td>
<td><a href="mailto:K.Gregg@curtin.edu.au">K.Gregg@curtin.edu.au</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>9266 7671</td>
</tr>
<tr>
<td>Fax:</td>
<td></td>
</tr>
<tr>
<td>Building:</td>
<td>308</td>
</tr>
<tr>
<td>Room:</td>
<td>226</td>
</tr>
<tr>
<td>Contact Hours:</td>
<td>9 a.m. – 5 p.m. Monday – Friday</td>
</tr>
</tbody>
</table>

Dr Gregg will assist you with your learning and any problems or difficulties you may experience while undertaking this unit, mark your assignments, provide feedback in relation to your progress, and deal with administrative aspects of the Unit.

To contact the lecturer, request an appointment by e-mail, allowing for a response time of up to one full working day. Availability permitting, direct contact at the office (308.226) can be arranged by appointment.

NOTE: Except for urgent matters, appointments will not be made on Tuesdays

UNIT COORDINATOR

For this unit, the unit coordinator is also the lecturer.

UNIT SYLLABUS

Biotechnology as it is applied to clinical therapies. Recent biotechnological advances and how they have contributed to alleviating ill-health arising from genetic anomalies, cancer, tissue or organ failure or deterioration, infectious agents or injuries. Recent progress within the underlying biotechnologies and in clinical outcomes for the treatments already available. New and future applications for existing technologies. Potential for and progress towards solutions to unmet needs in the alleviation of chronic ill-health.

LEARNING OUTCOMES

On successful completion of this unit, students will be able to:

1. describe the different areas of biotechnology that are currently, and potentially involved
in providing therapeutic solutions and evaluate their potential, 
2. explain the biological mechanisms underlying the different technologies, 
3. debate the relative merits of competing solutions for potential treatment of a range of 
   clinical problems, and 
4. critically review early-stage developments in important therapeutic fields.

LEARNING ACTIVITIES

Lectures will present information that forms the starting point for information gathering, collation, 
and analysis.

Tutorials will provide coaching in critical thinking. This will involve class discussions that cover 
questions associated with lectures and will allow students to participate in formative discussions.

Assignments are designed to encourage independent thinking and to provide experience in the 
evaluation of published material and technical claims, within scientific and technical fields that 
relate to health and wellbeing.

STUDENT FEEDBACK

Feedback from students is one very important way to keep improving this unit. You are 
encouraged to give unit and teaching feedback through eVALUate, Curtin’s online student 
feedback system (see http://evaluate.curtin.edu.au). Both positive and negative feedback are 
appreciated, expressed politely, as a basis for ongoing improvement of units and teaching 
methods.

LEARNING RESOURCES

Material relevant to the course will be provided as hard-copy at lectures and/or tutorials and in 
electronic form via Blackboard. Links to specific online information sources will be provided and 
general internet searches are encouraged as a way of sharpening your literature research skills, 
including broadening the range of sources from which material is gathered, judging the credibility 
of individual sources and balancing the opinions presented by those sources.

TEXT BOOK

BECAUSE OF THE RAPIDLY DEVELOPING NATURE OF BIOTECHNOLOGY, THERE IS 
NO SET TEXT-BOOK FOR THIS SUBJECT.

Students are expected to seek the most recent information on each topic via the internet and 
publication databases such as PubMed, with emphasis on demonstrably valid sources of 
information.

(Hint: Wikipedia is very useful as a starting point for definitions, keywords and explanations, but is not regarded as a reliable source on which to base important written information, or decisions, because of the lack of regulation in editorial alterations). Information obtained from 
Wikipedia should be confirmed by reference to material that is published in peer-reviewed 
journals. Do not cite Wikipedia as a reference.

For current developments in biotechnology and its basic research, the monthly journal Nature- 
Biotechnology is recommended, along with Nature medicine, Nature methods, Nature 
nanotechnology, Nature neuroscience, Stem Cells, Cell-Stem Cells, Journal of Experimental
Therapeutics and Oncology and many others that are accessible electronically through the Curtin Library web-page.

Other sites you may find useful are:

National Health Museum (USA) [http://www.accessexcellence.org/](http://www.accessexcellence.org/)

United States Food & Drug Administration (FDA) [http://www.fda.gov](http://www.fda.gov)


## ASSESSMENT DETAILS

### Assessment Summary

The assessment for this unit consists of the following items.

<table>
<thead>
<tr>
<th>Assessment Tasks</th>
<th>marks/100</th>
<th>Due</th>
<th>Unit Learning Outcome Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Study 1</td>
<td>25</td>
<td>Test: Thursday 9th August</td>
<td>2, 3, &amp; 4.</td>
</tr>
<tr>
<td>Case Study 2</td>
<td>30</td>
<td>Test: Thursday 13th September</td>
<td>1, 2, 3, 4.</td>
</tr>
<tr>
<td>Seminar on Review</td>
<td>15</td>
<td>Thursday 11th October</td>
<td>1, 2, 3, 4.</td>
</tr>
<tr>
<td>Final Examination</td>
<td>30</td>
<td>Examination period</td>
<td>1, 2, 3, 4.</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All components of the continuous assessment must be completed satisfactorily.

Failure to pass any single component may result in a fail for the unit.

### Assignment 1 – Therapeutic Case Study 1.

**Worth: 25%**

Students will be provided with a published report of a recently developed procedure or treatment. There will be a series of questions to be answered using information from the paper and from additional material that can be found by online search. Tutorial assistance will be provided for this assignment. The test for this study will be closed-book. i.e. use of notes or pre-prepared answers will not be allowed during the test.

NOTE: Students are encouraged to discuss their study topic with fellow students, but must construct and present their own answers for assessment. Any significant similarity in answers from different students must be investigated for collusion, which is a form of plagiarism.
Assignment 1 Marking Criteria
1. Accurate interpretation of the written article.
2. Demonstrated understanding of concepts, principles, and techniques described in the article.
3. Critical evaluation of the article particularly, but not solely, those areas covered by questions.
4. Clarity of meaning and completeness of answers to the questions.

Assignment 2 – Therapeutic Case Study 2.

Worth: 30%
Students will be provided with a published report of a recently developed procedure or treatment. The questions to be answered using information from the paper will not be provided in advance. The student's own copy of the paper can be used during the test and additional notes or annotations will be allowed during the test. This is officially an “open book” exam.

Tutorial assistance will be provided for this assignment and questions about the paper can be raised at any tutorial.

NOTE: Students are encouraged to discuss the paper with fellow students, but must write and submit their own work for assessment.

Assignment 2 Marking Criteria
1. Accurate interpretation of the written article.
2. Demonstrated understanding of concepts, principles, and techniques described in the article.
3. Critical understanding of the article as revealed by the ability to answer questions.
4. Clarity of meaning and completeness of answers to the questions.

Assignment 3 – Seminar Review of a published report

Worth: 15%
Individual students will make a short presentation (10 minutes talk; 5 minutes for questions) reviewing a paper of their own choosing on a therapeutic process or development that fits within the category of biotechnology. Each student should prepare their own slides in a clear, easily read format, and the presentation should be arranged in a logical sequence.

Assessment will be on the basis of:
1. Clarity of the presentation, slides, illustrations, and text.
2. Objective, in-depth analysis of the developing therapy, identifying the key factors for optimism or caution.
3. Good use of known facts and technical understanding on which to base opinions and conclusions and correct use of technical terminology.
4. Conciseness of presentation (avoiding unnecessary and irrelevant material and words), slides, illustrations and text. Simple, direct presentation is generally the most effective.

Referencing Style
Students should use the Curtin version of Chicago referencing style when preparing assignments. More information can be found on this style from the Library web site: http://library.curtin.edu.au/referencing/index.html. Accuracy and formatting of referencing will contribute to the marks assigned for all assignments.

Marking
Marking and feedback on tests is expected to take approximately one week. Failure to attend an assignment test must be justified by a medical certificate or other appropriate evidence of
inability to attend. The opportunity to take a test at a later date will be considered under certain conditions. If a deferred test is required for Case-Study 2, the questions set will differ from those in the original test.

**Plagiarism Monitoring**

All assignments submitted for assessment must be monitored for plagiarism. Curtin University takes plagiarism very seriously and current rules compel unit coordinators to forward evidence of anything above level 1 plagiarism to the Executive Dean of the Faculty. In postgraduate units, any plagiarism is automatically classified as level 2 or above.

Assessment and consequences of plagiarism at levels 2 and 3 are decided at Faculty level and unit coordinators cannot help students in this process.

You must understand what constitutes plagiarism, students should consult the university definitions and policies on: [http://academicintegrity.curtin.edu.au/studentbook.html](http://academicintegrity.curtin.edu.au/studentbook.html), and should consult the booklet that can be downloaded from this site.

Understanding of this concept and of plagiarism policies at Curtin is vital to all students, because they may differ significantly from the policies of other educational institutions.

**STUDENTS’ RESPONSIBILITIES**

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter,
- the University’s Guiding Ethical Principles,
- the University’s policy and statements on plagiarism and academic integrity,
- copyright principles and responsibilities,
- the University’s policies on appropriate use of software and computer facilities,
- students’ responsibility to check enrolment,
- deadlines, appeals, and grievance resolution,
- student feedback,
- other policies and procedures
- electronic communication with students

See [www.students.curtin.edu.au/administration/responsibilities.cfm](http://www.students.curtin.edu.au/administration/responsibilities.cfm) for comprehensive information on all of the above.

**ADDITIONAL INFORMATION**

**Contact by e-mail or Telephone:**

If a meeting with the unit coordinator is necessary, please make an appointment by e-mail, or by telephone on 9266 7671 or internally, extension 7671

**Supplementary and Deferred Examinations**

Supplementary examinations are awarded only at the discretion of the Board of Examiners and are not automatically awarded. The Board of Examiners will carefully review individual cases.

The aim of a supplementary examination is to allow the student to correct minor problems or deficiencies in the initial assessment. They are not a mechanism to gain extra study time or correct major problems. Supplementary examinations will contain different questions from those
in the standard paper. The number of supplementary examinations awarded will be kept to a minimum for any one examination period and for this course of study.

Written applications for supplementary examination cannot be considered.

Supplementary examinations, if awarded, will be indicated on the official Curtin examination result statement posted to all students. A list confirming details will also be placed on the official School Noticeboard. It is your responsibility to check. A student who does not sit for a scheduled supplementary examination has no claim to a further examination.

Deferred examinations may be applied for prior to the nominated examination date. Application for deferrals after the examination has been conducted will only be considered under highly extenuating circumstances.

### UNIT STUDY CALENDAR  
**Semester 2**

<table>
<thead>
<tr>
<th>WEEK STARTING</th>
<th>LECTURE TOPIC:</th>
<th>Assignments &amp; Tutorials</th>
<th>DUE DATE</th>
</tr>
</thead>
</table>
| 16 July       | L1. Introduction to Biotech Therapies | Case Study 1  
Analysis of a published report | Test on 9 Aug |
|               | L2. Biochemical Therapies -1 |                          |          |
| 23 July       | L3. Biochemical Therapies -2 | Analysis of tutorial questions |          |
|               | L4. Vaccines |                          |          |
| 30 July       | L5. Approaches to vaccination | Analysis of tutorial questions |          |
|               | L6. Antibody-based therapies |                          |          |
| 6 August      | L7. Genetic Diseases - 1 | Case Study 1  
Test. Thurs 9th August.  
Case study 2: Analysis of a published report | Test on 13th Sept |
<p>|               | L8. Genetic Diseases - 2 |                          |          |
|               | L10. Cancer treatments - solid tumours |                          |          |
| 20 August     | L11. Stem-Cell therapies | Analysis of tutorial questions |          |
|               | L12. Recent developments in Stem Cells |                          |          |
| 27 August     | <strong>No classes this week</strong> |                          |          |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Section</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Sept</td>
<td>L13. Inflammatory Diseases - 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis of tutorial questions.</td>
</tr>
<tr>
<td>8 Sept</td>
<td>L15. Tissue and organ damage - 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L16. Tissue and organ damage - 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Case Study 2 Test. Thursday 13th Sept</td>
</tr>
<tr>
<td>9 Sept</td>
<td>L17. Emerging Therapies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L18. Nano-Biotechnology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis of tutorial questions</td>
</tr>
<tr>
<td>10 Sept</td>
<td>L19. Drug Delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L20. Xenobiotics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis of tutorial questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis of tutorial questions</td>
</tr>
<tr>
<td>12 Oct</td>
<td></td>
<td>Student Seminars – during tutorial time-slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student Seminars – during lecture timeslot</td>
</tr>
<tr>
<td>15 Oct</td>
<td></td>
<td>Study Week</td>
</tr>
<tr>
<td>22 Oct</td>
<td></td>
<td>Examinations</td>
</tr>
<tr>
<td>29 Oct</td>
<td></td>
<td>Examinations</td>
</tr>
</tbody>
</table>