

526301 Microbial cells and genomes, Semester 1, 2007

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Weblog for discussion threads on "Study Questions": microbepundit.blogspot.com

Wiki http://www.microbiol.unimelb.edu.au/people/tribe/wiki/index.php/Main_Page
 This wiki website will be used to provide both guidance and a venue for the written assignment.

Microbial cell biology:**The diverse cast of bacterial characters featuring in the course:**

Escherichia coli, *Streptomyces avermitilis*, *Pseudomonas aeruginosa*
Bacillus subtilis, *Caulobacter crescentus*

Major themes

Key cell components and their functions - with function translating as cell physiology
 Mechanisms of cell growth, division and differentiation
 Diversity of microbial cell specialisations and adaptations
 Mechanisms by which microbial diversity is generated
 Microbial genomes as archives of evolution
 Tools for studying microbe biology
 Reviews of some current active research topics in microbial cell biology

526301 L1/01 Monday 1:00pm - 2:00pm Medical-Frederic Wood Jones Theatre, 1 hour

526301 L2/01 Thursday 1:00pm - 2:00pm Medical-Frederic Wood Jones Theatre, 1 hour

526301 L3/01 Friday 9:00am - 10:00am Medical-Frederic Wood Jones Theatre, 1 hour

Lecture Sessio	Week starting:	Lecturer	Topic
1	26/02/07	DET	Introduction, Objectives, Expectations, Assessment Reading: Chapter: 1 Schaechter et al 2006
Basics of bacterial cell biology			
2	26/02/07	DET	Microbial cell structure Reading: Chapter: 2,3 Schaechter et al 2006
3	26/02/07	DET	Making a cell Reading: Chapter: 5 Schaechter et al 2006
4	5/03/07	DET	The cell cycle Reading: Chapter: 9 Schaechter et al 2006
5	5/03/07	DET	Key course concepts illustrated by model species <i>Escherichia coli</i> , <i>Pseudomonas aeruginosa</i> <i>Caulobacter</i> , <i>Bacillus</i> and <i>Streptomyces</i>
6	5/03/07	DET	Briefing on assignment Microbial diversity and Evolution. Reading Chapters: 10, 11 Schaechter et al 2006
Mechanisms of bacterial evolution			
7	12/03/07	HBL	The bacterial DNA molecule Reading Chapters: 8, 10 Schaechter et al 2006 16/03/07 Early outline plan for assignment to be completed on wiki talk page. Reading and reference leads for assignment to be identified.
8	12/03/07	HBJ	Genetic variation in procaryotes Reading Chapter:10 Schaechter et al 2006
9	12/03/07	HBJ	Recombination and transposition
10	19/03/07	HBJ	Plasmid biology Reading: Nancy Jo Trun, J. E. Trempy (2003)
11	19/03/07	HBJ	Genetic exchange 1 Reading: Nancy Jo Trun, J. E. Trempy (2003)
12	19/03/07	HBJ	Genetic exchange 1 Reading: Nancy Jo Trun, J. E. Trempy (2003)
13	26/03/07	HBJ	Reductive evolution. Tutorial. Reading: Nancy Jo Trun, J. E. Trempy (2003)
14	26/03/07	MDS	Bacteriophage biology
15	26/03/07	MDS	Phage lambda and lysogeny
Tools for microbial cell biology			
16	2/04/07	DET	Review of experimental tools for studying cell biology
17	2/04/07	DET	Tools, approaches and concepts used in cell culture
18	6/04/07		GOOD FRIDAY (Mid semester break)
19	16/04/07	MDS	Overview of how microbial genomes are analysed
20	16/04/07	DET	Systematic dissection of genome functions in <i>E. coli</i> O157
21	16/04/07	DET	Discussion session on criteria for assessing assignment Trouble-shooting, feedback on student problems
Microbial growth processes			
22	23/04/07	DET	Fueling Reading Chapter: 6, Schaechter et al 2006
	23/04/07		27/04/07, Deadline for completion of assignment mini-review in a readable form

*This a a first draft version that is a basic for constructive criticism.
(Please refer to classroom instructions for the meaning of this deadline)*

23	23/04/07	DET	Biosynthesis. Reading Chapter: 7, Schaechter et al 2006
24	23/04/07	MDS	Building macromolecules I: Gene expression RNA synthesis Reading Chapter:8, Schaechter et al 2006, pages 141-148
25	30/04/07	MDS	Building Macromolecules II: Protein synthesis and folding Reading Chapter:8, Schaechter et al 2006, pages 149-158
26	30/04/07	HBJ	Building Macromolecules III: Protein secretion, modification and envelope formation Reading Chapter:8, Schaechter et al 2006, pages 156-166

Microbial cell physiology - how bacteria function

27	30/04/07	DET	Coordination and regulation Reading Chapter:12, Schaechter et al 2006
28	7/05/07	MDS	Case studies of transcriptional regulation
29	7/05/07	DET	Global regulation mechanisms Reading Chapter:12, Schaechter et al 2006, pages 238-246 Gross, L. (2005)
30	7/05/07	HBJ	Functions of the cell membrane and other surface layers Reading: Peter Greenberg, 2000 Chapter:13, Schaechter et al 2006, pages 263-268 Chapter:6, Schaechter et al 2006, pages 90-96
31	14/05/07	DET	Succeeding in the environment : individual cells respond to stress Reading: Chapter:13, Schaechter et al 2006, pages 248-270 Wingreen NS, Levin SA (2006) Gross, L. (2005)
32	14/05/07	DET	Differentiation and development Reading: Chapter:14, Schaechter et al 2006 David Hopwood, 2003
33	14/05/07	DET	Interactions between organisms Reading: Chapter:19, Schaechter et al 2006

Examples of recent research on microbial cell biology

34	21/05/07	DET	Recent research on quorum sensing Wingreen NS, Levin SA (2006)
35	21/05/07	DET	Chemical Specialisation of Streptomyces David Hopwood, 2003
36	21/05/07	MDS/DET	Course review 25/05/07 Final assignment All assessable work on assignments to be complete

Reading

Explanatory commentaries (Essential reading):

Pump up the versatility (*Pseudomonas genome*) **NATURE VOL 406 p947, 2000.**
E. Peter Greenberg

Cooperation among Microorganisms.

Wingreen NS, Levin SA (2006) **PLoS Biol 4(9): e299 doi:10.1371/journal.pbio.0040299**
<http://biology.plosjournals.org/perlserv/?request=get-document&doi=10.1371%2Fjournal.pbio.0040299>

Mapping Core Communication Networks in Bacte **PLoS Biol 3(10): e359 doi:10.1371/journal.pbio.0030359**

Gross, L. (2005)
<http://biology.plosjournals.org/perlserv/?request=get-document&doi=10.1371%2Fjournal.pbio.0030359>

The Streptomyces genome - be prepared **NATURE BIOTECHNOLOGY**
David Hopwood **VOL 21 p506-507 May 2003**

Additional reading as detailed in the lecture sessions from:

Moselio Schachter et al.(2006)
Microbe
ASM 2006
Book ISBN 1-55581-320-8

Nancy Jo Trun, J. E. Trempey (2003)
Fundamental Bacterial Genetics, Blackwell

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