

BIMM 120 BACTERIOLOGY

SYLLABUS

INSTRUCTOR:

Willie Claiborne Brown, Ph.D.
Professor Emeritus
Fall 2009

Administrative Details

Course Instructor--Willie Claiborne Brown, Ph.D., Professor Emeritus

Office Location: HSS 1145F

Office Hours--M, 9-9:45; W, 11-12

*****Not Available During Summer**

Telephone: 858-534-3463 (best results through email)

email<wbrown@ucsd.edu> (Routinely only after we have met in person; no restrictions in use for urgent matters or emergencies)

Teaching Assistants:

Text -- Microbiology: An Evolving Science, J.L. Slonczewski and J.W. Foster; Companion text: Coming to Terms with Germs (Available for free when purchase with the text as a package)

Course Reader--*More Bacteriology*, by W.C. Brown, on sale at bookstore

Exams

1) **Midterm**--MT=50% of course, corrections must be made in one week.

Date and Time: October 30, 8:00 AM

2) **Final**--50% of course; comprehensive;

Date and Time: MON, Dec 7, 8:00 AM

*No regrades except for administrative, clerical or computational errors

*Alternate or makeup exams given only for documented extreme emergencies such as severe illness or death in the family.

* No special provisions provided for students who have three final exams on the same day. Look at your exam schedules NOW!

If you fit within this category, you might want to take the course during another quarter

*Both exams are based on **material covered in lectures** that might include specific references to and assignments based on material in the text, Reader, and on WebCt. **Textbook readings to provide depth.**

*No professional note-takers allowed in course.

Podcasts of the lecture will be available.

WebCt available: please check NLT than 10PM each night before class for any updates

Academic Honesty: You are expected to do your own work. All persons suspected of cheating will be dealt with according to the university regulations regarding academic dishonesty.

BIMM 120

Lecture Schedule

Fall 2009

Location: Peterson Hall 110

Time: MWF 8:00-8:50 AM

Lec	Wk	Mo	Date	Topics Covered
1	0	Sep	25	Introduction
2	1	Sep	28	Introduction; Structure and Function
3		Sep	30	Structure and Function
4		Oct	2	Structure and Function
5	2	Oct	5	Structure and Function
6		Oct	7	Structure and Function
7		Oct	9	Structure and Function: Growth
8	3	Oct	12	Growth
9		Oct	14	Growth
10		Oct	16	Growth
11	4	Oct	19	Growth
12		Oct	21	Growth
13		Oct	23	Growth
14	5	Oct	26	Metabolism
15		Oct	28	Metabolism
16		Oct	30	Midterm
17	6	Nov	2	Genetics
18		Nov	4	Genetics
19		Nov	6	Microbes and Human Disease
20	7	Nov	9	Microbes and Human Disease
		Nov	11	Holiday – Veteran's Day
21		Nov	13	Representative Gram negative bacteria
22	8	Nov	16	Representative Gram negative bacteria
23		Nov	18	Representative Gram negative bacteria
24		Nov	20	Representative Gram negative bacteria
25	9	Nov	23	Representative Gram negative bacteria
26		Nov	25	Representative Bacteria with atypical or no Cell Walls: Representative Gram positive Bacteria;
		Nov	26	THANKSGIVING HOLIDAY
27	10	Nov	30	Representative Gram positive Bacteria
28		Dec	2	Representative Gram positive Bacteria
29		Dec	4	Representative Gram positive Bacteria

INTRODUCTION

Subject	Chapter	Page(s)
<i>Coming to Terms with Germs</i>		
Introduction		All
From Germs to Microbes	1	All
The Diverse World of Microbes	2	All
Why Microbes are Here to Stay	3	All
<i>Norton Text</i>		
History and Key Developments	1	11-29-32-35
Scope and Relevance of Microbiology	1	35-36
Future of Microbiology	1	
Microorganisms and their Relationships to Other Forms of Life	1	29-32
Eukaryotic Organelles	Appendix 2	32-38; 764

STRUCTURE AND FUNCTION OF PROKARYOTIC CELLS

Subject	Chapter	Page(s)
<i>Coming to Terms with Germs</i>		
Introduction to Biology of Microbes; The Significance of Structure <i>Norton Text</i>	4	54-62
Morphological Properties of Bacteria	2	41-42; 52-54
Comparative Biology of Gram Positive and Negative Cells	Reader	
Bacterial Cell Organization		
External Structures of Procaryotic Cells		
Capsules, Slime Layers, and S-Layers	3	93-94
Pili and Fimbriae	3	107-108
Flagella and Motility; Chemotaxis	3	109-111
Cell Walls and Cell Envelope	3	88-96
Biosynthesis of Peptidoglycan	27	1038-1039
Autolysins	Lecture	
Archael Cell Envelopes	19	724
Internal Procaryotic Structures		
Membrane Structure and Function	3	82-88
Nucleoid	3	98-99
Cytoplasmic Matrix	3	105-107
Protein Secretion in Procaryotes	8	285-290
Structure and Function of Procaryotic Resting Cells		
General Characteristics	18	690 (Table 18.3)
The Bacterial Endospore	18	683; 692-693

BACTERIAL GROWTH

Subject	Chapter	Page(s)
<i>Coming to Terms with Germs</i>		
Growth and Nutrition	4	62-71
How to Keep Germs Under Control	8	All
<i>Norton Text</i>		
Reproduction in Prokaryotes	4	134-140
The Growth Curve		
The Mathematics of Growth	4	135-137
Measurement of Growth	4	130-133
Continuous Culture	4	138-139
Synchronous Growth	Lecture	
Factors Influencing Growth		
Nutrient Factors	4	115-120
Complex or Synthetic Media	4	130-131
Enrichment and Differential Media	4	“
Environmental Factors		
Solutes and Water Activity	5	157-158
Temperature		152-155
Oxygen		164-168
pH		159-164
Pressure		155-156
Nutrient Deprivation and Starvation		
		168-170
Control and Destruction of Microorganisms		
Introduction		170-172
Physical Agents		
Temperature		172-173
Filtration		173
Radiation		174-175
Chemical Agents		175-178
Biological Control Agents	▼	178-179
Antimicrobial Chemotherapy		
Introduction and Basic Concepts	27	1029-1033
Mechanism of Action of Selected Antimicrobial Agents	↓	1037-1046
Drug Resistance	↓	1047-1052

METABOLISM

Subject	Chapter	Pages
<i>Coming to Terms</i>		
Overview of Metabolism	4 Lecture notes	71-77
<i>Norton Text</i>		
Energy from Catabolism of Organic Compounds		
From Glucose to Pyruvate	13	482
Glycolysis	13	483-485
Phosphate Pentose Pathway	13	486-487
Entner-Doudoroff Pathway	13	485-486
Pyruvate Utilization by Aerobes:		
TCA Cycle	13	491-496
Electron Transport System	14	506-514
Pyruvate Utilization by Anaerobic and Facultative Heterotrophs		
Fermentation	13	487-490
Anaerobic Respiration	14	525
Aromatic Catabolism	13	496-500
Energy from Inorganic Compounds (Chemolithoautotrophy)	14	529-534
Phototrophy	14	534-544
The Nitrogen Cycle	4	120
Anabolism		
Aspects of Regulation in Bacteria		
Overview	10	346-354
Induction of Catabolic Pathways	10	349-351
Catabolic Repression	10	351-355
Repression of Anabolic Pathways	10	355; 361 Fig 10.12
Signal Transduction	10	347-348
Quorum Sensing	10	378-380

Microbial Genetics

Subject	Chapter	Page(s)
<i>Coming to Terms</i>		
The Biology of Microbes (Genetics)	4	77-85
<i>Norton Text</i>		
Mutation and Selection of Mutants	9	320-326
Bacterial Viruses	6	187-190
Creating Genetic Variability		
Plasmids	7	243-244
Transposable Elements	9	333-336
Gene Transfer Mechanisms		304-316
Conjugation		
Transformation		
Transduction	▼	▼
Recombinant DNA Technology		Powerpoint Presentation

MICROBES AND HUMAN DISEASE

Subject	Chapter	Page(s)
<i>Coming to Terms</i>		
Why Microbes are Here to Stay	3	45
Where Germs Hang Out and How They Move Around	5	86
How Your Body Protects You from Germs	6	100
How Germs Cause Disease	7	125
How to Come to Terms with Germs	9	165

BACTERIAL DIVERSITY

Gram Positive Bacteria

Phototrophic Bacteria		
Cyanobacteria	18	683
Green and Purple Bacteria	18	704
Lithotrophic Bacteria		
<i>Nitrobacter</i>	18	708
<i>Nitrosomonas</i>	18	708
<i>Thiobacillus</i>	18	708-709
Aerobic Cocci		
<i>Neisseria</i>	18	706
<i>Azotobacter</i>	15	570-571
Aerobic Rods		
<i>Pseudomonas</i>	18	711-712
<i>Legionella</i>	18	711-712
Acetic Acid Bacteria	Lecture	
<i>Rhizobium</i>	18	706
	21	820-821
<i>Agrobacterium</i>	“	“
Facultative Rods		
The Enteric Bacteria	18	709-710
<i>Escherichia</i>		
<i>Salmonella</i>		
<i>Proteus</i>		
<i>Yersinia</i>		
Anaerobic Rods		
<i>Bacteroides</i>	18	714
Helical and Curviform Bacteria		
<i>Bdellovibrio</i>	18	712-713
<i>Vibrio</i>	25	951-953
<i>Helicobacter</i>	18	713-714
<i>Treponema</i>	18	715-716
<i>Borrelia</i>	“	“
Budding and Appendaged Bacteria		
<i>Caulobacter</i>	3	108
Gliding Bacteria		
<i>Cytophaga</i>	Lecture	
<i>Myxococcus</i>	18	712

Gram Negative Bacteria

Bacteria	Chapter	Page(s)
Cocci		
<i>Staphylococcus</i>	18	696-697
<i>Streptococcus</i>	18	696-697
<i>Enterococcus</i>	18	696-697
<i>Lactococcus</i>	18	696
<i>Oral Streptococci</i>	23	866-867
Sporeforming Rods		
<i>Bacillus</i>	18	692-694
<i>Clostridium</i>	18	694-696
Nonsporeforming Rods		
<i>Lactobacillus</i>	18	699-700
<i>Propionibacterium</i>	16	592-593
<i>Bifidobacterium</i>	23	870
<i>Dehalobacter</i>	18	697-698
<i>Listeria</i>	18	696-697
<i>Corynebacterium</i>	18	702
<i>Mycobacterium</i>	18	700-702
<i>Arthrobacter</i>	18	702
<i>Frankia</i>	18	700
<i>Streptomyces</i>	18	699-700