

CAMOSUN COLLEGE
Biology Department

Biology 260, Pathophysiology for Dental Hygiene
Winter 2004

COURSE OUTLINE

Instructor

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Textbooks

Gould, B.E.(2002). *Pathophysiology for the Health Professions.*, 2nd edition. W.B. Saunders Company

Any general text on Human Anatomy and Physiology (optional)

Course Content

Biology 260 is an introductory course in human pathophysiology emphasizing the pathogenesis of injury and disease. The course explores general concepts, processes and patterns of disease, using specific diseases as examples, but does not deal specifically with oral pathology although concepts and diseases discussed will have relevance to dentistry. Selected disease processes and injuries are examined at the cellular, organ and organismal level, providing a broad overview of pathophysiology. Since pathophysiology builds upon basic physiology, some review will be necessary. It is essential that students in this course have a good understanding of physiology and some of the associated anatomy. There will be no time to review or re-teach the physiology. Topics listed as **review** in the outline are ones that you would have already covered in prerequisite courses and will not be re taught in class.

Presentation

The course will be presented primarily as lectures but will incorporate class discussions directed toward problem solving. Students are expected to prepare for class by reviewing topics before they are taught in class and ensuring that they are familiar with the relevant physiology. During the course, you will obtain information from several sources including lectures, class discussions, class presentations and textbooks. Do not rely exclusively on any one, or only some, of these sources. The course outline lists the various topics that will be covered. **Some of the topics involve self-study (indicated in the outline) and will not be covered in lectures. They too are examinable.** While

lectures will cover the various topics in the outline, they will not specifically be formatted to answer the objectives. The objectives serve as a guideline for your learning in the course.

Evaluation

Quizzes (3) and assignments (2)	20%
Midterm test (February, 26th)	35%
Final examination	45%

Assignment guidelines will be provided in class. All assignments must be prepared and written individually.

Examinations must be written at the specified date and time, unless there is a medical emergency that prevents you from doing so. You must notify the Instructor as long **before** the start of the examination as possible and submit a doctor's note that indicates the doctor's evaluation that you were unable to write.

The following percentage conversion to letter grade will be used:

A+ = 95 - 100%	B = 75 - 79%	D = 50 - 59%
A = 90 - 94%	B- = 70 - 74%	F = 0.0 - 49%
A- = 85 - 89%	C+ = 65 - 69%	
B+ = 80 - 84%	C = 60 - 64%	

Course Outline and Objectives

Introduction to Pathophysiology

1. Become familiar with and correctly use appropriate medical / pathological terminology
2. Describe cellular adaptations to altered conditions / stress
 - atrophy
 - hypertrophy
 - hyperplasia
 - metaplasia
 - dysplasia
 - anaplasia
 - neoplasm
3. Discuss the mechanisms of the following causes of cellular damage
 - ischemia
 - anaerobic metabolism
 - physical injury
4. Define necrosis and differentiate between liquefaction and coagulative necrosis

Inflammation and Healing

1. Explain the association between inflammation and healing
2. Describe the mechanism of acute inflammation
 - cells involved
 - chemical mediators
 - exudate formation
 - vascular response
3. Differentiate between the vascular and cellular responses of inflammation
4. Describe the following types of exudates
 - serous
 - purulent
 - hemorrhagic
 - serosanguineous

5. List the systemic effects of inflammation
6. Differentiate chronic inflammation from acute inflammation
7. Discuss the treatment of inflammation
 - anti-inflammatory drugs
 - steroids
 - heat
 - cold
8. Describe the process of healing (**self-study and assignment #1**, pages 22-24)
 - resolution
 - regeneration
 - scar tissue formation
 - granulation
 - epithelialization
9. Discuss the factors that promote and impede healing

Abnormal Immune Responses

1. **Review** the components of the immune system
2. List the major features of the cellular components of the immune system (**review**)
 - macrophages
 - lymphocytes
 - T-cells
 - B-cells
 - NK cells
3. Differentiate between specific and non specific defenses
4. Explain the roles of the following components of non specific defense (**review**)
 - physical barriers
 - phagocytes
 - immunological surveillance
 - interferons
 - complement system
5. Differentiate between and describe cell-mediated and antibody-mediated immunity
6. Differentiate the following type of immunity: natural, natural passive, artificial active and artificial passive

7. Differentiate between the primary and secondary responses to antigens
8. Describe primary and secondary immune deficiencies and their effects
9. Describe the mechanism of transplant rejection
10. Describe the types, mechanisms and consequences of hypersensitivity reactions
 - Type I (allergy)
 - Type II (cytotoxic)
 - Type III (immune complex)
 - Type IV (cell-mediated or delayed)
11. Describe the mechanism of autoimmune disorders using SLE (systemic lupus erythematosus) as an example (**assignment #2**)

Infection

1. List the major groups of micro-organisms that can be pathogenic
2. Discuss host / pathogen interaction by explaining the following
 - mode of action
 - infectivity
 - pathogenicity
 - antigenicity
 - toxigenicity
 - virulence
3. Describe the various forms of transmission of infection
4. Describe the events in the onset and course of infection
5. Describe the local and systemic signs and symptoms of infection
6. Distinguish between the mode of action of antibacterial and antiviral drugs

Neoplasms

1. **Review** the events in a normal cell cycle
2. Describe a neoplasm
3. Differentiate between benign and malignant tumors

4. Describe the pathogenesis of tumors
5. Define the term metastasis and explain the 3 stages of metastasis
6. Explain the methods of grading / staging tumors
7. List the major risk factors for cancer (**self-study**, pages 92-94)
8. Describe the major diagnostic tests for cancers
 - cytology
 - histology
 - imaging
 - tumor markers
9. Describe the general treatment options for cancer
10. Explain the problems associated with cancer treatment

Fluid-Electrolyte and Acid-Base Imbalances

1. Discuss the major causes and consequences of edema
2. Discuss the major causes and consequences of dehydration
3. Define and describe how the following respiratory and metabolic imbalances develop
 - acidosis
 - alkalosis

Aging and Disease

1. Discuss the major theories of aging
2. Identify the key events of the aging process
3. Describe the effects of aging on the following organ systems
 - endocrine
 - reproductive (**self-study**, pages 168-169)
 - female
 - male
 - cardiovascular
 - heart
 - vessels

- musculoskeletal
 - bone
 - muscle
- respiratory
- nervous system (**self-study**, page 172)
 - neurons
 - senses
- gastrointestinal
- urinary

Stress

1. Define the terms stress and stressor
2. Describe the general adaptation syndrome (**review or self-study**, page 184 & physiology text book)
 - hormones involved and their roles
3. Using appropriate examples, explain how stress can cause disease

Cardiovascular Disorders

1. Define anemia and describe its general pathophysiology and manifestations
2. Differentiate amongst the following types of anemia and explain the major features of each one
 - iron deficiency anemia
 - pernicious anemia
 - aplastic anemia
 - hemolytic anemia
 - sickle cell anemia
3. Describe coronary artery disease and its risk factors
4. Explain and differentiate between angina pectoris and myocardial infarction
5. Discuss congestive heart failure
 - definition
 - pathophysiology
 - manifestation
 - management

6. Describe the following inflammatory / infectious conditions of the heart
 - infective endocarditis
 - pericarditis
7. Define hypertension and classify it into its different stages (more detailed coverage of hypertension in the Pharmacology course, winter year 2)
8. Discuss the causes and consequences of the major types of shock (**self-study**, pages 301-306)

Respiratory Disorders

1. Describe the following general manifestations of respiratory disease
 - cough
 - dyspnea
 - wheezing
 - hemoptysis
 - cyanosis
2. Describe the following infectious diseases
 - pneumonia
 - tuberculosis
3. Describe the following obstructive disorder
 - asthma
4. Describe the following vascular disorder
 - pulmonary embolus
5. Describe the following expansion disorder
 - pleural effusion

Digestive System Disorders

1. Discuss the causes and effects of
 - gastritis
 - peptic ulcers
2. Discuss the causes and effects of the following hepatic disorders
 - hepatitis
 - cirrhosis

3. Discuss the following inflammatory bowel disorders
 - Crohn's disease
 - ulcerative colitis
 - appendicitis

Urinary System Disorders

1. Discuss the pathophysiology of acute and chronic renal failure
2. Discuss the principles of hemodialysis and peritoneal dialysis (**self study**, pages 428-429)

Neurologic Disorders

1. Describe the following general aspects relating to neurological dysfunction
 - left and right hemisphere effects
 - level of consciousness
 - motor dysfunction
 - sensory deficits
 - speech disorders
 - seizures
 - increased intracranial pressure
2. Explain why brain tumors are regarded as the most destructive lesions of the CNS and considered life threatening
3. Describe the following vascular disorders
 - cerebrovascular accidents
 - transient ischemic attacks
4. Describe the following infectious disorders
 - meningitis
 - encephalitis
5. Describe the following chronic degenerative disorders
 - Parkinson's disease
 - Alzheimer's disease

Endocrine Disorders

1. Describe the basis of endocrine disorders
 - hyosecretion
 - hypersecretion
2. Explain diabetes mellitus and classify the 2 major types
3. Describe the acute complications of diabetes mellitus
 - insulin shock (hypoglycemia)
 - diabetic ketoacidosis
3. Discuss the pathophysiology of diabetes mellitus and explain how it leads to chronic complications
 - vascular
 - neuropathy
 - infections
4. Define goiter and explain why it may be present in both hypo- and hypersecretion of the thyroid gland
5. Describe the main features of hyperthyroidism
6. Describe the main features of hypothyroidism
7. Describe the following conditions in relation to adrenal gland malfunction
 - Cushing's syndrome
 - Addison's disease

You are encouraged to consult the instructor if you require assistance or experience difficulty with the course. The following services are also available to you.

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Registrar's Office or the College web site at <http://www.camosun.bc.ca>

ACADEMIC CONDUCT POLICY

There is an Academic Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.