CAMOSUN COLLEGE
Biology Department

Biology 260, Pathophysiology for Dental Hygiene
Winter 2003

COURSE OUTLINE

Instructor

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Textbooks

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

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 in lecture format with some discussion and group work. 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, class presentations, assignments	20%
Midterm test (**February, 27th**)	35%
Final examination	45%

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
    - morphological and structural damage

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**)
    - 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 or self-study**)
    - macrophages
    - lymphocytes
        - T-cells
        - B-cells
        - NK cells

3. Differentiate between specific and non specific defenses (**review or self-study**)

4. Explain the roles of the following components of non specific defense (**review or self-study**)
    - 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 erythematosis) as an example

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. Become familiar with and correctly use tumor nomenclature

5. Describe the pathogenesis of tumors

6. Define the term metastasis and explain the 3 stages of metastasis

7. Explain the methods of grading / staging tumors

8. List the major risk factors for cancer (**self-study**)

9. Describe the major diagnostic tests for cancers
    - cytology
    - histology
    - imaging
    - tumor markers

10. Describe the general treatment options for cancer

11. Explain the problems associated with cancer treatment

Fluid-Electrolyte and Acid-Base Imbalances

1. **Review** the fluid compartments and the distribution of fluid within them

2. **Review** the concentrations of major electrolytes in intracellular and extracellular fluid

3. **Review** the sources of fluid intake and routes of fluid loss

4. Discuss the major causes and consequences of edema

5. Discuss the major causes and consequences of dehydration

6. Discuss the major causes and consequences of electrolyte imbalances
    - hypernatremia
    - hyponatremia
    - hyperkalemia
    - hypokalemia
    - hypercalcemia
    - hypocalcemia

7. **Review** the definitions of acids, bases and pH

8. Describe how buffers regulate pH
    - carbonic acid – bicarbonate buffer
    - phosphate buffer
    - protein buffers

- explain the significance of the Hendersen-Hasselbalch equation

9. Describe how respiratory and metabolic imbalances develop

10. Discuss acid base compensation

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**)
        - female
        - male
    - cardiovascular
        - heart
        - vessels
    - musculoskeletal
        - bone
        - muscle
    - respiratory
    - nervous system (**self-study**)
        - neurons
        - senses
    - gastrointestinal
    - urinary

Stress

1. Define the terms stress and stressor

2. Describe the general adaptation syndrome (**review or self-study**)

    - 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
    - vitamin B_{12} and folic acid 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

8. Define the following type of hypertension
    - primary hypertension
    - secondary hypertension
    - malignant hypertension

9. Describe the risk factors, pathophysiology, manifestation and management of primary hypertension

10. Define shock (**self-study**)

11. Compare and contrast the causes and consequences of the major types of shock (**self-study**)

Respiratory Disorders

1. Describe the following general manifestations of respiratory disease
    - cough
    - dyspnea
    - breathing sounds
    - altered respiratory pattern
    - 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. Describe the causative factors in urinary tract infections

2. Describe the pathophysiology of glomerulonephritis, its manifestations and treatment

3. Differentiate between acute and chronic renal failure

4. Discuss the etiology of acute renal failure

5. Discuss the stages in the development of chronic renal failure

Neurologic Disorders

1. Describe the following general aspects relating to neurological dysfunction
    - local effects
    - supra- and infratentorial lesions
    - left and right hemisphere effects
    - level of consciousness
    - motor dysfunction
    - sensory deficits
    - visual loss
    - 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
    - hyposecretion
    - 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. Describe hyper- and hyposecretion of the pituitary gland

5. Define goiter and explain why it may be present in both hypo- and hypersecretion of the thyroid gland

6. Describe the following conditions in relation to thyroid gland malfunction
    - cretinism
    - myxedema
    - Hashimoto's thyroiditis
    - Grave's disease

7. Describe the following conditions in relation to adrenal gland malfunction
    - Cushing's syndrome
    - aldosterone hypersecretion
    - 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.