University of Ottawa
PHS4300B: PATHOPHYSIOLOGY
Fall 2019

POST: Aug 22 9 AM. ***UPDATE Aug 27, 3 PM (p 2, Deferred midterm exam date).***

UPDATE Nov 14 (pp 1 and 3, final exam date)

COURSE DESCRIPTION

This is a three-credit course in which some of the most common diseases involving kidney function, diabetes, cancer, the blood system, the gastrointestinal tract, the lungs, the cardiovascular system, and the nervous system are discussed. The aim of the course is to help students understand the etiology, pathology and current trends in treatment of these diseases. There will be a single 3-hour lecture per week. The schedule for the term as well as the objectives of the course are detailed below.

COURSE COORDINATOR Dr. Frank Feiner
Department of Cellular & Molecular Medicine
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TEXTBOOK: There is no required textbook (each professor will provide notes) but the designated textbook is **"Pathophysiology by L.C. Copstead and J.L. Banasik 6th ed** which can be borrowed at the library (arrival is pending) or purchased from the University of Ottawa bookstore. Note that many of your lectures will not come from this text. As well, the book will no doubt be replaced by a newer edition within the next 2-4 years. Hence its purchase is not recommended.

COURSE WEBSITE: **Brightspace (**PHS4300[B] Pathophysiology Fall 2019 20199**)**

LECTURES: Tuesdays 10:00 AM-12:50 PM RGN 2005

EVALUATION:

There will be two exams as well as online assignments in this course. Exam 1 will cover the first 5 lectures and is worth 43.2% of the final grade. The final exam will cover the remaining 6 lectures and is worth 51.8%. **The final exam is not cumulative**. There will be 10 multiple choice questions (MCQs) per lecture so the midterm exam will have 50 MCQs and the final exam 60 MCQs. Each professor will provide exam questions for their lectures. The remaining 5% of the grade will be from online assignments on virtual campus throughout the term. ***The due dates for the assignments*** (*see below*) ***are final and extensions will not be granted under any circumstance*** so please pay careful attention the deadlines. Your grade will be based entirely on the exams and online assignments and it is not possible to obtain extra credit from additional assignments and/or exams. The distribution of marks is final and it is not possible to change the weight of the exams or assignments. There are ***no supplemental exams*** for this course.

Exam questions ***will not*** be made available after the exam, the exam booklet must be returned with your answer sheet. Past exams will not be made available but samples of the exam questions will be posted on the course website prior to the exam. A simple calculator is permitted during exams. Phones of any kind and laptops/tablets are strictly prohibited.

EXAM	DATE	% OF FINAL GRADE
Midterm (Lectures 1-5)	Tuesday, October 22nd	43.2% of final mark
Online assignments in Brightspace	Throughout term (*see below*)	5% of final mark
Final Exam (Lectures 6-11)	Dec 5, 9:30 AM RGN 2003/2022	51.8% of final mark
Total		100%

What to do if you miss an exam

If you have to miss an exam due to illness, you must notify the course coordinator (Dr. Frank Feiner, ffeiner@uottawa.ca) ***before*** the exam takes place. You have 5 school days from the day of the exam to provide (*via* email) appropriate medical documentation indicating that you were seen by your family physician or by University of Ottawa Health Services – for the final exam you MUST see a U Ottawa Health Services doctor – on or before exam day and found by that health care provider to be too ill on exam day to write your exam. Only then will you be eligible to write a deferred exam.

If you do not write the regular exam or deferred exams, you will obtain a zero for that section of the course. You should familiarize yourself with the University's academic regulations and the policy on Justification of Absence from an Examination. The deferred exams will each have a different set of questions.

Deferred Exams: The date for the deferred midterm is Thursday, November 21, at 9 AM; the date for the final exam will be announced later. Note that these dates are set by the Department of Cellular and Molecular Medicine and are non-negotiable since other course exams will also be given on these dates

Note: Based on a statistical analysis of the computer-generated grade reports, some questions on the regular midterm and final exams may not be used in your grade calculation (# correct / # allowed exam questions) unless they are answered correctly. Such adjustments will not be made for the deferred exams (grade is # correct /total # of exam questions) due to the relatively small numbers of students involved.

IMPORTANT INFORMATON

Power-point lecture slides and/or lecture PDF documents from the professors will be available on the course website. Please note that last minute updates to the notes by the professors may occur just before the lecture. If you wish to print the notes, you should do so no earlier than 1 day prior to the lecture.

** You are strongly encouraged to read the lecture slides/notes before coming to class.** All exam questions will be based on the lecture notes and the material presented in class.

Please examine key Academic Dates and Deadlines and Health Sciences regulations on minimum grades required and on academic fraud. You should visit the Student Academic Success Service (SASS) website for all the services available to students. Mentors are available for this course. More information on this will be provided during the early lectures. Remember, there are lots of opportunities for help before the exams but nothing after the exams have been completed.

Assignment Schedule

ASSIGNMENT	AVAILABLE (~ 2 PM)	DUE DATE (10:00 PM)
[1] Ketoacidosis	September 24th	October 19th
[2] Diabetic Retinopathy	September 24th	October 19th
[3] Hyperosmolar Coma	September 24th	October 19th
[4] Celiac Disease	October 29th	November 29th
[5] GERD	October 29th	November 29th
[6] Asthma Attack	November 5th	November 29th
[7] Panic Attack	November 5th	November 29th

- *Assignments will be available on Brightspace after the relevant lecture.*

- *Assignments can be done as many times as you like but **only the grade scored on the FIRST attempt counts***
- *Assignments due dates are final and no extensions will be granted.*

PHS4300B Fall 2019 Lecture Schedule

Tuesdays 10:00 AM - 1:00 PM, RGN2005	Topic	Professor
[1] September 10	Brief Course Introduction Renal System	Dr. Feiner, Course Coordinator ffeiner@uottawa.ca Dr. Christopher Kennedy ckennedy@uottawa.ca
[2] September 17	Fluids, Electrolytes & Acid-Base Balance	Dr. Kennedy
[3] September 24	Diabetes	Dr. Jerry Radziuk jradziuk@uottawa.ca
[4] October 1	Neoplasia	Dr. Christine Pratt christine.pratt@uottawa.ca
[5] October 8	Blood System	Dr. Joanne Savory Joanne.Savory@uottawa.ca
October 13 – 19	Reading Week	
October 22	Midterm Exam (Lectures 1-5, 43.2% grade)	Dr. Feiner
[6] October 29	Gastrointestinal System	Dr. Feiner
[7] Nov 5	Respiratory System	Dr. Feiner
[8] November 12	Cardiovascular System, Part I	Dr. Feiner
[9] November 19	Cardiovascular System, Part II	Dr. Feiner
[10] November 26	Nervous System, Part I	Dr. Feiner
[11] December 3	Nervous System, Part II	Dr. Feiner
December 5, 9:30 AM RGN 2003/2022* **	Final Exam (Lectures 6-11, 51.8% grade)	Dr. Feiner

* The first 5 min will be an introduction to the course.
** Only professors teaching at least 9 hours will be evaluated
**** Adams – Kavanagh will write in RGN2003. Khlawey-Zuo will write in RGN2022

PHS4300B Fall 2018 Course Objectives

Renal System Disorders

[September 10, 2019 – Dr. C. Kennedy]

1. Review the structure and function of the kidney and urinary tract.
2. Review the structure and function of the nephron.
3. Glomerular filtration
    - 3.1. Describe the structure of the glomerular capillary membrane, and review the physics and regulation of glomerular filtration.
    - 3.2. Define glomerular filtration rate (GFR); explain how it can be estimated from creatinine measurements and how it can be affected in renal disorders.
    - 3.3. Explain how the ultrafiltration coefficient can be affected in renal disorders, and define proteinuria and microalbuminuria.
4. Discuss the general features of renal disorders in terms of possible causes (prerenal, intrarenal, post renal), and signs and symptoms. Describe the information that can be obtained from urine analysis and blood test.
5. Obstructive disorders
    - 5.1. List the common causes of urinary tract obstruction.
    - 5.2. Define hydroureter and hydronephrosis, and recognize the destructive effect of urinary tract obstruction on kidney structures.
    - 5.3. Describe the types of kidney stones and the contributing factors.
6. Urinary infections
    - 6.1. Describe the defense mechanisms that protect the renal system from infection.
    - 6.2. Discuss the etiology and describe the clinical manifestations of urinary tract infections.
    - 6.3. Describe the etiology and clinical manifestations of acute and chronic pyelonephritis
7. Glomerulopathies
    - 7.1. List the main causes of glomerulopathies.
    - 7.2. Explain the difference between nephritic and nephrotic syndromes.
8. Acute renal failure
    - 8.1. Differentiate the prerenal, intrarenal and postrenal forms of acute renal failure.
    - 8.2. Discuss the diagnosis, clinical manifestations and treatment of acute renal failure.
9. Chronic kidney disease (CKD)
    - 9.1. State the most common causes of CKD.
    - 9.2. Describe the stages of CKD based on GFR measurement.
    - 9.3. Explain the physiological mechanisms underlying the common problems associated with CKD, including alteration of fluid, electrolyte and acid-base balance.
    - 9.4. Describe and explain the cardiovascular, hematologic and skeletal disorders associated with CKD.
    - 9.5. Briefly discuss the treatments used to slow the progression of CKD.
10. Explain the principles underlying dialysis treatment, and compare hemodialysis with peritoneal dialysis.

Body Fluids, Electrolytes and Acid-Base Balance Disorders

[September 17, 2019 – Dr. C. Kennedy]

1. Disorders of sodium and water balance
    - 1.1. Review the concepts of body fluid homeostasis.
    - 1.2. Explain the difference between the two main categories of fluid imbalance: i) isotonic changes of ECF, ii) hypertonic or hypotonic changes in extracellular water.
    - 1.3. State and explain the main causes and manifestations of isotonic fluid volume deficit and excess.
    - 1.4. State and explain the main causes and manifestations of hyponatremia and hypernatremia.
2. Disorders of potassium balance
    - 2.1. Review the concepts of K+ homeostasis.

2.2. State and explain the main causes and manifestations of hypokalemia and hyperkalemia. 2.3. Briefly discuss the treatment of hyperkalemia.

3. Disorders of calcium balance
    3.1. Review the concepts of Ca2+ homeostasis
    3.2. State and explain the main causes and manifestations of hypocalcemia and hypercalcemia.
4. Disorders of acid-base balance
    4.1. Review acid-base chemistry.
    4.2. Review the role of the kidneys and the lungs in pH homeostasis.
    4.3. Compare the physiological effects of acidosis and alkalosis.
    4.4. Explain the four primary acid-base disorders, their associated compensatory response and the common causes.
    4.5. Interpret the laboratory measurements to differentiate the types of acid-base disorder.
    4.6. Explain the use of the plasma anion gap in differentiating types of metabolic acidosis.

Diabetes

[September 24 – Dr. J. Radziuk]

1. Examples of case histories of type 1 and type 2 diabetes; definitions, signs and symptoms
2. Introduce glucose homeostasis
3. Locate islets of Langerhans and describe their cellular composition; identify the cells responsible for the synthesis of insulin as well as glucagon other hormones; describe secretion of insulin and its regulation at cellular and molecular level
4. Distinguish between the postprandial and fasting states. Describe glucose tolerance.
5. Summarize the mechanisms of action of insulin; detail insulin regulation of the metabolism of carbohydrates, lipids and proteins and its target tissues; integrate insulin action in the fasting and postprandial states, during exercise and its defects in type 1 and type2 diabetes
6. Glucagon: describe the metabolic effects of glucagon, its role in counterregulation; describe the coordination of insulin and glucagon in glucose homeostasis - fasting, postprandial, exercise and diabetes.
7. Summarize the pathogenesis of type 1 diabetes, its genetics and its effect on metabolism; epidemiology
8. Type 2 diabetes: its genetics, natural history and pathophysiology of metabolism and its regulation; epigenetics, metabolic regulation and the development of type 2 diabetes; beta cell failure and insulin resistance; epidemiology, risk factors
9. Obesity and type 2 diabetes: mechanisms which contribute to obesity - environmental, CNS; complications of obesity
10. Other types of diabetes: gestational, polycystic ovary syndrome, drug-induced, post kidney transplant and latent autoimmune diabetes in adults.
11. Treatments of type 1 diabetes: insulin and analogs of varying duration of action, subcutaneous insulin, glucose monitoring, closed loop systems (artificial pancreas), pancreas or islet transplants
12. Treatments of type 2 diabetes: lifestyle change, pharmacological -oral hypoglycemics, GLP-1 analogs, insulin and their target tissues; weight loss and bariatric surgery
13. The microbiome, type 2 diabetes and its treatment
14. Describe the chronic effects of diabetes mellitus on the vascular, renal, visual, and nervous systems.
15. Describe three acute complications of diabetes mellitus, (1) diabetic ketoacidosis, (2) hyperosmolar coma, and (3) reactions to insulin, according to the causes, clinical signs, metabolic changes, and treatment.
16. Describe screening and testing for diabetes

Neoplasia

(October 1 – Dr. C. Pratt)

1. Cell cycle
    1.1. Briefly review the stages of cell cycle
    1.2. Define apoptosis and discuss its regulation.
    1.3. Describe the types of genes that regulate the cell cycle.
2. Cancer-associated genes
    2.1. Recognize that cancer is a disorder primarily caused by mutations of genes that control cell cycle.

2.2. Define oncogene and explain how its activation affects cell cycle.
2.3. Define tumor suppressor gene, describe the major types, and explain how its inactivation affects cell cycle.

3. Stages of carcinogenesis
3.1. Define primary and secondary tumors.
3.2. Describe the development of a primary tumor. In doing so, define neoplasm, hyperplasia, dysplasia.
3.3. Distinguish between benign and malignant neoplasm.
3.4. Define metastasis and recognize the characteristics of a cancer cell that allow the formation of new colonies in distant sites.

4 Describe the causes and risk factors associated with cancer.

5. Epidemiology of cancer
5.1. Discuss cancer incidence according to age and sex.
5.2. Describe cancer incidence and death rates according to primary tumor location.

6. Cancer treatment: describe and discuss the therapeutic strategies currently used to fight cancer.

Blood System

[Oct 8, 2019 – Dr. J. Savory]

1. Briefly, review the composition and functions of blood, as well as the process of hematopoiesis.
2. Describe the hematologic tests and the significance of the measurements.
3. Define anemia, give the clinical manifestations, and explain the compensatory mechanisms.
4. Explain the classification of anemias based on (i) general causes and (ii) RBC indices.
4.1. Anemias of Deficient RBC production
4.1.1. Aplastic anemia: explain the main causes and clinical manifestations of aplastic anemia, and explain how chronic disease can lead to anemias.
4.1.2. Iron-deficiency anemia: review iron homeostasis and describe the causes and clinical manifestations of iron-deficiency anemia; list diagnostic tests and discuss nutritional strategies for prevention and treatment of iron deficiency anemia
4.1.3. Megaloblastic anemia: explain why deficiency of cobalamin (vitamin B_{12}) or folate leads to macrocytic anemia; compare the causes and describe clinical manifestations and diagnostic tests for these deficiencies.
4.2. Hemolytic anemias:
4.2.1 Explain the clinical manifestation & compare the differences between
i) intrinsic (generally hereditary) & extrinsic causes (generally acquired)
ii) intravascular and extravascular hemolysis.
4.2.2. Describe the major causes of acquired hemolytic anemias.
4.2.3. Thalassemia: explain the causes, pathophysiology and different forms; describe clinical manifestations, treatment and complications of thalassemia.
4.2.4. Describe the pathophysiology, clinical manifestations and treatment of the sickle cell disease and hereditary spherocytosis
4.2.5 Hemolytic Disease of the Newborn: explain the causes & pathophysiology; describe clinical manifestations, treatment and complications.
5. Polycythemia
5.1. Define polycythemia and explain the differences between the three types of polycythemias.
5.2. Describe the clinical manifestations, pathophysiology, complications and treatment of polycythemia vera.
6. Leukemia and lymphoma
6.1. Review the types of white blood cells.
6.2. Define leukemia, describe the four general types and explain the differences between them
6.3. Define lymphoid neoplasia, lymphoid leukemia, lymphoma and lymphadenopathy.
6.4. Compare the signs and symptoms, pathophysiology and treatment of non-Hodgkin and Hodgkin lymphomas.
7. Briefly review the stages of hemostasis and compare the information obtained from INR (international normalized ratio) and PTT (partial thromboplastin time) tests.
8. Hemostasis: Platelet disorders:
8.1 Define thrombocytopenia, discuss the possible causes, pathophysiology and clinical manifestations

8.2 Define thrombocytosis and describe the conditions and factors that can induce thrombosis, with specific examples of disorder associated with each case.

9. Hemostasis: Coagulation disorders:
   9.1. Describe the causes, pathophysiology, clinical manifestations and treatment of von Willebrand disease and hemophilia.
   9.2. Describe the role of vitamin K in coagulation; list the sources of vitamin K and discuss the causes and consequences of vitamin K deficiency
   9.3. Discuss causes, pathophysiology and consequences of thrombosis. List known treatment options for undesirable blood clots
   9.4. Explain the pathophysiology, clinical manifestations and typical laboratory findings of disseminated intravascular coagulation.
   9.5. Describe the most common tests for bleeding disorders

Gastrointestinal System

(Oct 29, 2019 – Dr. F. Feiner)

1. Briefly summarize the six digestive processes
2. Mouth and Associated Organs.
   2.1. List the roles of salivation. Describe how salivation is controlled. Define xerostomia.
   2.2. Describe stomatitis and angular stomatitis and their causes
   2.3. List and describe briefly three other diseases of the oral cavity
3. The Esophagus
   3.1. Explain the pathophysiology of achalasia. Summarize its clinical presentation and briefly indicate how this condition can be diagnosed and managed
   3.2. Define gastroesophageal reflux disease (GERD). List and explain its effects, symptoms, diagnosis and treatment
   3.3. Describe the pathophysiology of Barrett's esophagus
   3.4. Explain the pathophysiology of hiatal hernia
   3.5. Describe the cause, symptoms, diagnosis and treatment of esophageal varices and justify their poor prognosis
   3.6. List the risk factors, symptoms, diagnosis, prognosis, treatment and prevention of esophageal cancer
4. The Stomach
   4.1. Briefly summarize the physiological activities of the stomach
   4.2. List and briefly describe those factors that can alter the secretion of gastric acid and/or the protective mucus barrier to gastric acid
   4.3. Recognize the diversity of emetic stimuli and summarize the regulation of emesis
   4.4. Justify the role of Helicobacter pylori as a risk factor for gastritis, gastric ulcers and cancer.
   4.5. Distinguish between acute gastritis and chronic gastritis (both fundal and antral) in terms of risk factors, clinical manifestations and treatment
   4.6. Be able to provide the definition, location, effects, mechanisms and risk factors for peptic ulcer disease
   4.7. Distinguish between gastric and duodenal ulcers in terms of risk factors, symptoms, causes, potential consequences, evaluation, and treatment
   4.8. Discuss the types, epidemiology, risk factors, stages of development, symptoms, and diagnosis of gastric carcinoma
5. Accessory Organs of the GI Tract: The Liver, Gallbladder and Pancreas
   5.1. Describe the roles played by the liver
   5.2. Describe the generation of gallstones; summarize their clinical presentation and treatment; define obstructive jaundice
   5.3. Briefly describe the changes in liver structure and function that occur in cirrhosis and explain how these changes can result in the accumulation of ascites fluid and the development of esophageal varices
   5.4. Describe the exocrine function of the pancreas
   5.5. Discuss the genetic basis, pathophysiological consequences, and management of cystic fibrosis

6. The Intestines
    6.1. List the two intestinal symptoms of lactose intolerance and summarize the management of this food intolerance
    6.2. Distinguish between large volume and small volume diarrhea; List the three types of large volume diarrhea, providing an example of each; describe the changes in intestinal function that are responsible for each type of diarrhea
    6.3. Describe two general dysfunctions that can lead to malabsorption, giving examples of each
    6.4. Explain the genetic and immunological bases for celiac disease; describe the pathological changes, clinical signs, diagnosis and management of this disease
    6.5. Discuss the similarities and differences between the 2 types of inflammatory bowel disease: Crohn's and ulcerative colitis. Distinguish between the 2 in terms of location, clinical presentation and pathological changes in the intestinal wall. Briefly summarize their diagnosis and treatment.
    6.6. Quantify the bacterial flora of the large intestine
    6.7. Define diarrhea, constipation, and diverticulitis. Discuss relationship between dietary fiber and diverticulitis
    6.8. List the various types of intestinal obstructions that can occur; describe the clinical presentation and justify the need for prompt surgical correction
    6.9. List the risk factors for the development of hemorrhoids
    6.10. Briefly describe irritable bowel in terms of clinical presentation, prevalence in the population, possible risk factors, triggers and management
    6.11. Discuss appendicitis in terms of prevalence, clinical manifestations and treatment
    6.12. List the risk factors for colon cancer and briefly summarize the staging of cancers developing in the colon or rectum
    6.13. Briefly describe how the 3 kinds of laxatives work

Respiratory System

(Nov 5, 2019 – Dr. F Feiner)

1. Introductory Pathophysiology
    1.1. Know terminology and definitions for normal breathing and certain abnormalities
    1.2. Understand the equation for the hydrolysis of carbon dioxide
    1.3. Know the function of normal coughing and the terminology for abnormal coughing
    1.4. Know the significance of breathing pain, abnormal sputum and cyanosis
    1.5. Define clubbing; define and explain Schamroth's sign
2. Normal Pulmonary Physiology
    2.1. Describe the four aspects of respiration
    2.2. Describe the basic anatomy of the upper and lower respiratory systems
    2.3. Describe the structural components of an alveolus
    2.4. Describe the lungs pleural coverings
    2.5. Define the pressure relationships in the thoracic cavity
    2.6. Discuss the two physical factors influencing pulmonary ventilation
    2.7. Know what is measured via pulmonary function testing
    2.8. Discuss ventilation/perfusion coupling
    2.9. Describe the effect of gravity and air pressure on pulmonary blood flow
    2.10. Know the relationship between respiration and blood pH
3. Pneumothorax, Pleural Effusion and Hypoxia
    3.1. Know what produces a pneumothorax
    3.2. Know what is mean by pleural effusion
    3.3. Describe the types of hypoxia
    3.4. Describe what happens during a 'shallow water blackout'
4. Respiratory Distress Syndromes
    4.1. What is the function of alveolar surfactant?
    4.2. Know what occurs in infant respiratory distress syndrome
    4.3. Know what occurs in adult respiratory distress syndrome

5. Obstructive Pulmonary Disease
    5.1. Know the causes of increased airway resistance
    5.2. Distinguish between the 2 types of sleep apnea
    5.3. Know the similarities and differences between acute bronchitis and asthma
    5.4. Know the difference between extrinsic and intrinsic asthma
    5.5. Describe the clinical manifestations of and general treatment approach to asthma
    5.6. Distinguish between the 2 types of chronic obstructive pulmonary disease and how it differs from the acute variety
    5.7. Discuss definition, symptoms, prevention and treatment of bronchiectasis
    5.8. Describe the etiopathogenesis and pathophysiology of chronic bronchitis
    5.9. Describe the etiopathogenesis and pathophysiology of emphysema
    5.10. Compare the types of COPD
6. Pulmonary Cystic Fibrosis
    6.1. Describe the etiopathogenesis and pathophysiology, symptoms, diagnostic criteria, treatments, and prognosis of pulmonary cystic fibrosis
7. Pulmonary Infectious Diseases
    7.1. Describe the transmission, epidemiology, course, pathophysiology, clinical manifestations, prevention, treatment and prognosis of pulmonary tuberculosis
    7.2. Describe the pathophysiology, clinical manifestations, and prevention/treatment of bacterial Pneumonia
    7.3. Differentiate viral from bacterial pneumonia
    7.4. Describe the etiology, symptoms and treatment of croup
8. Respiratory Illnesses in the News
    8.1. Outline the pathogenesis and health concerns associated with: SARS, Enterovirus D68 and Legionnaires' disease

Cardiovascular System

[November 12, 19 – Dr. F. Feiner]

We will review, explain, give examples of, describe the etiology/ pathogenesis/cause and manifestations of and/or give the clinical manifestations of the following:

1. Alterations In Blood Flow
    1.1General Mechanisms That Cause Altered Flow
    1.2Alterations In Arterial Flow
    1.3 Alterations In Venous Flow
    1.4 Alterations In Lymphatic Flow
2. Alterations In Blood Pressure
    2.1Arterial Blood Pressure
    2.2 Mechanisms Of Blood Pressure Regulation
    2.3Hypertension
    2.4 Low Blood Pressure
3. Cardiac Function
    3.1 Cardiovascular Anatomy
    3.2 Cardiac Cycle
    3.3 Geriatric Considerations: Changes In The Heart
    3.4 Coronary Circulation
    3.5 Cardiac Myocytes
    3.6 Molecular Basis Of Contraction
    3.7 Cardiac Energy Metabolism
    3.8 Electrocardiography
    3.9 Determinants Of Cardiac Output
    3.10 Endocrine Function Of The Heart
    3.11Tests Of Cardiac Function

4. Alterations In Cardiac Function
   4.1 Coronary Heart Disease
   4.2 Endocardial And Valvular Diseases
   4.3 Pericardial Diseases
   4.4 Congenital Heart Diseases
5. Heart Failure and Dysrhythmias
   5.1 Heart Failure
   5.2 Cardiac Dysrhythmias
6. Shock
   6.1 Pathogenesis Of Shock
   6.2 Types Of Shock
   6.3 Complications Of Shock

Nervous System Objectives

(November 26 & Dec 3, 2019 – Dr. F. Feiner)

We will review, explain, give examples of, describe the etiology/ pathogenesis/cause and manifestations of and/or give the clinical manifestations of the following:

1. The Clinical Method of Neurology
   1.1. Approach to the Patient with Neurologic Disease
   1.2. Imaging, Electrophysiologic, and Laboratory Techniques for Neurologic Diagnosis
2. Cardinal Manifestations of Neurologic Disease
   2.1 Disorders of Motility
      2.1.1 Lower Motor Neuron Disease
      2.1.2 Upper Motor Neuron Disease
      2.1.3 Patterns of Paralysis
      2.1.4 Motor Apraxia
      2.1.5 Basal Ganglia Movement Abnormalities
      2.1.6 Cerebellar Dysfunction
         2.1.6.1 Tremor
         2.1.6.2 Clonus, Pathological Startle Syndromes, Focal Dystonias, Blepharospasm and Other head/Neck Muscle Spams
      2.1.7 Task-Specific Dystonias
      2.1.8 Drug-Induced Tardive Dyskinesias
      2.1.9 Tic and Habit Spasms
      2.1.10 Akathisia
      2.1.11 Disorders of Stance and Gait
   2.2 Pain and Other Disorders of Somatic Sensation
      2.2.1 Pain
      2.2.2 Other Sensory Syndromes
      2.2.3 Headache
         2.2.3.1 Mechanisms of Cranial Pain
         2.2.3.2 Migraine Headache
         2.2.3.3 Tension Headache
      2.2.4 Vision
         2.2.4.1 Neurologic Causes of Reduced Vision
         2.2.4.2 Cerebral Blindness
   2.3 Epilepsy and Other Seizure Disorders
      2.3.1 Introduction
      2.3.2 Classification
      2.3.3 Focal Seizure Patterns
      2.3.4 Generalized Seizures
         2.3.4.1 Tonic-Clonic (Grand Mal) Seizures

2.3.4.1.1 Status Epilepticus
2.3.4.2 Absence (Petit Mal Seizures)
2.3.5 Focal/Partial Seizures
2.3.5.1 Frontal Lobe Seizures
2.3.5.2 Focal Sensory Seizures
2.3.5.3 Focal Seizures with Altered Awareness
2.3.5.4 Behavioral Disorders with Temporal Lobe Epilepsy
2.3.6 Psychogenic Nonepileptic Seizures
2.3.7 EEG and Lab Testing for Epilepsy
2.3.8 Treatment of Epilepsy

2.4 Coma and Related Disorders of Consciousness
2.4.1 Definitions
2.4.2 Confusion
2.4.3 Drowsiness and Stupor
2.4.4 Coma
2.4.5 Reticular Activating System
2.5 Faintness and Syncope
2.5.1 Introduction
2.5.2 Causes
2.5.3 Clinical Features
2.5.3.1 The Common Faint (Vasopressor Syncope)
2.5.3.2 Exercise-Induced Syncope, Carotid Sinus Syncope
2.5.3.3 Micturation Syndrome, Tussive/Valsalva Syncope
2.5.3.4 Orthostatic Hypotension
2.6 Sleep and Its Abnormalities
2.6.1 Insomnia
2.6.2 Restless Legs Syndrome. Periodic Leg Movements of Sleep
2.6.3 Treatment of Insomnia
2.6.4 Parasomnic Disturbances
2.6.4.1 Somnolescent Starts, Sensory Sleep Paroxysms, Sleep Paralysis, Night Terrors, Somnambulism/Sleep Automatism, REM Sleep Behaviour Disorder, Nocturnal Epilepsy, Pathologic Excessive Sleep, Kleine-Levin Syndrome
2.6.5 Sleep Apnea
2.6.6 Narcolepsy and Cataplexy
2.7 Delirium and Other Acute Confusional States
2.7.1 Definitions: Confusion, Delirium, Amnesia, Dementia
2.7.2 Clinically Observable Aspects: Attention, Perception, Memory, Thinking, Emotion/Mood/Affect, Activity, Social Behaviour, Loss of Insight
2.7.3 Classification
2.7.4 Laboratory Testing
2.8 Dementia
2.8.1 Introduction
2.8.2 Common Causes of Dementing Illness
2.8.3 Stages of Alzheimer Dementia
2.8.3.1 Mild Cognitive Impairment
2.8.3.2 Signs and Symptoms of Worsening Dementia
2.8.3.2.1 Motor Changes Involved
2.8.3.3 Late Stage Dementia
2.8.4 Pathogenesis of Dementia
2.8.5 Differential Diagnosis of Dementia