

## Outline of topics for placement into BIO 204, Testing in the CCD Testing Center –

Topics: cardiovascular/immunology, respiratory, digestive/metabolism, renal, endocrine, reproductive systems

### Cardiovascular System

- I. The Cardiovascular System
  - A. Pulmonary circulation
  - B. Systemic circulation
- II. Functions of the Heart
  - A. Generating blood pressure
  - B. Routing blood
  - C. Ensuring one-way blood flow
  - D. Regulating blood supply
- III. Size, Form, and Location of the Heart
- IV. Anatomy of the Heart
  - A. Pericardium
    1. Fibrous pericardium
    2. Serous pericardium
      - a) Parietal pericardium
      - b) Visceral pericardium (epicardium)
    3. Pericardial cavity and fluid
  - B. External anatomy
    1. Sulci
    2. Veins
    3. Arteries
  - C. Blood supply to the heart
    1. Coronary arteries
    2. Cardiac veins
  - D. Heart chambers and internal anatomy
    2. Right and left ventricles
    3. Septa
    4. Major vessels
  - E. Heart valves
    1. Atrioventricular
      - a) Tricuspid
      - b) Bicuspid (mitral)
    2. Semilunar
      - a) Pulmonary semilunar
      - b) Aortic semilunar
    3. Papillary muscles and chordae tendinae
    4. Cardiac skeleton
- V. Route of Blood Flow through the Heart
  - A. Entry
  - B. Exit
- VI. Blood Supply to the Heart
  - A. Coronary Arteries
  - B. Cardiac veins and coronary sinus

## VII. Histology of the Heart

- A. Heart wall
  - 1. Epicardium (visceral pericardium)
  - 2. Myocardium
  - 3. Endocardium
- B. Cardiac muscle
  - 1. Cells, myofibrils, myofilaments, and sarcomeres
  - 2. Intercalated disks and gap junctions

## VIII. Electrical Activity of the Heart

- A. Action potentials in cardiac muscle
  - 1. Comparison of skeletal and cardiac muscle
  - 2. Plateau phase and voltage-gated  $\text{Ca}^{2+}$  channels
  - 3. The refractory period
  - 4. Spontaneous activity in SA node
- B. Conduction system of the heart
  - 1. SA node (pacemaker)
  - 2. AV node
  - 3. Atrioventricular bundle
  - 4. Left and right bundle branches
  - 5. Purkinje fibers
- C. Electrocardiogram
  - 2. QRS complex
  - 3. T wave
  - 4. P-Q (P-R) interval
  - 5. Q-T interval
  - 6. Cardiac arrhythmias

## IX. Cardiac cycle

- A. Atrial systole and
- B. Ventricular systole and diastole
- C. Events of a single complete cycle

## X. Heart Sounds

- A. First heart sound
- B. Second heart sound
- C. Murmurs
  - 1. Incompetent valves
  - 2. Stenosed valves

## XI. Regulation of Heart Function

- A. Cardiac output
- B. Intrinsic regulation of the heart
  - 1. Preload and afterload
  - 2. Starling's law of the heart
- C. Extrinsic regulation of the heart
  - 1. Sympathetic and parasympathetic
  - 2. Baroreceptor reflex
  - 3. Cardioregulatory center
  - 4. Epinephrine and norepinephrine
  - 5. Chemoreceptors in medulla oblongata
  - 6. Emotions
  - 7. Ions
  - 8. Body temperature

## XII. Systems Pathology — Myocardial Infarction

## XIII. Effects of Aging on the Heart

### I. Functions of the Peripheral Circulation

- A. Carry blood
- B. Exchange nutrients, waste products, and gases
- C. Transport
- D. Regulate blood pressure
- E. Direct blood flow

### II. General Features of Blood Vessel Structure

- A. Vessel walls
  1. Tunica intima
  2. Tunica media
  3. Tunica adventitia (externa)
- B. Arteries
  1. Elastic arteries and elastic recoil
  2. Muscular arteries
    - a) Distributing (medium-sized) arteries
    - b) Small diameter arteries
    - c) Vasoconstriction and vasodilation
    - d) Arterioles
- C. Capillaries and precapillary sphincters
- D. Veins
  1. Venules and small veins
  2. Medium-sized veins
  3. Large veins
  4. Valves

### III. Blood Vessels of the Pulmonary Circulation

- A. Pulmonary trunk and arteries from right ventricle
- B. Pulmonary veins to left atrium

### IV. Blood Vessels of the Systemic Circulation: Arteries

- A. Aorta
  1. Ascending aorta and coronary arteries
  2. Aortic arch
  3. Descending aorta
    - a) Thoracic aorta
    - b) Abdominal aorta
    - c) Termination in common iliac arteries
- B. Arteries of the head and neck
  1. Brachiocephalic artery
    - a) Right common carotid artery
      - (1) Right internal carotid artery
      - (2) Right external carotid artery
    - b) Right subclavian artery
      - (1) Right vertebral artery
  2. Left common carotid artery
    - a) Left internal carotid artery
    - b) Left external carotid artery
  3. Left subclavian artery
    - a) Left vertebral artery
  4. Arteries supplying the brain

- a) Internal carotid arteries
    - b) Vertebral arteries
    - c) Circle of Willis
  - C. Arteries of the upper limbs
    - 1. Subclavian arteries
    - 2. Axillary arteries
    - 3. Brachial arteries
    - 4. Radial and ulnar arteries
  - D. The thoracic aorta and its branches
    - 1. Visceral arteries
    - 2. Parietal arteries
  - E. The abdominal aorta and its branches
    - 1. Unpaired
      - a) Celiac artery
      - b) Superior mesenteric artery
      - c) Inferior mesenteric artery
    - 2. Paired visceral branches
      - a) Renal arteries
      - b) Suprarenal arteries
      - c) Testicular (or ovarian) arteries
    - 3. Parietal branches
      - a) Inferior phrenic arteries
      - b) Lumbar arteries
      - c) Medial sacral artery
  - F. Arteries of the pelvis
    - 1. Common iliac arteries
      - a) External iliac arteries
      - b) Internal iliac arteries
    - 1. External iliac arteries
      - a) Femoral arteries
      - b) Popliteal arteries
        - (1) Anterior tibial artery
        - (2) Posterior tibial artery
        - (3) Dorsalis pedis
- V. Blood Vessels of the Systemic Circulation: Veins
- A. Veins of the head and neck
    - 1. External jugular veins
    - 2. Internal jugular veins
    - 3. Subclavian veins
    - 4. Brachiocephalic veins
  - B. Veins of the upper limbs
    - 1. Deep veins
      - a) Brachial veins
      - b) Axillary veins
    - 2. Superficial veins
      - a) Cephalic veins
      - b) Basilic veins
      - c) Median cubital veins
      - d) Axillary veins
  - C. Veins of the thorax
    - 2. Azygos vein
    - 3. Hemiazygos vein
  - D. Veins of the pelvis and abdomen
    - 1. Pelvis
      - a) External iliac veins

- b) Internal iliac veins
  - c) Common iliac veins
- 2. Abdomen
  - a) Renal, suprarenal, and gonadal veins
  - b) Hepatic portal system
- E. Veins of the lower limbs
  1. Great saphenous veins
  2. Small saphenous veins
  3. Popliteal veins
  4. Femoral veins
  5. External iliac veins

## VI. The Physiology of Circulation

- A. Blood pressure
  1. Auscultatory method of BP determination
    - a) Sphygmomanometer
    - b) Kortokoff sounds
  2. Systolic pressure
  3. Diastolic pressure
  4. Variation in different vessels
- B. Pressure and resistance
  1. Vasoconstriction increases resistance
  2. Vasodilation decreases resistance
- C. Pulse pressure
- D. Capillary exchange

## VII. Local Control of Blood Vessels

- A. Precapillary sphincters
- B. Growth of new capillaries

## VIII. Nervous control of blood vessels

- A. Vasomotor center
- B. Vasomotor tone

## IX. Regulation of Arterial Pressure

- A. Mean Arterial Pressure = Peripheral resistance  $\times$  cardiac output
- B. Baroreceptor reflexes
- C. Chemoreceptor reflexes
- D. Hormonal mechanisms
  1. Adrenal medullary mechanism
  2. Renin-angiotensin-aldosterone mechanism
  3. Vasopressin mechanism
  4. Atrial natriuretic mechanism
- E. Short-term and long-term regulation

## X. Age-Related Changes in Blood Vessels

- A. Arteriosclerosis
- B. Atherosclerosis

## LYMPHATIC SYSTEM

### I. Lymphatic System

- A. Functions of the lymphatic system
  1. Fluid balance
  2. Fat absorption
  3. Defense

- B. Lymphatic capillaries and vessels
  - 1. Lymphatic capillaries and lymph formation
  - 2. Right lymphatic duct
  - 3. Thoracic duct
- C. Lymphatic organs
  - 1. Tonsils
    - a) Palatine tonsils
    - b) Pharyngeal tonsils
    - c) Lingual tonsils
  - 2. Lymph nodes
  - 3. Spleen
  
  - 4. Thymus
  - 5. Overview of the lymphatic system

## II. Immunity

- A. Innate immunity
- B. Adaptive immunity
  - 1. Specificity
  - 2. Memory

## III. Innate Immunity

- A. Mechanical mechanisms
  - 1. Skin and mucous membranes
  - 2. Tears, saliva, and urine
- B. Chemical mediators
  - 1. Lysozyme
  - 2. Histamine, prostaglandins, leukotrienes
  - 3. Complement
  - 4. Interferons
- C. Cells
  - 1. Phagocytic cells
    - a) Neutrophils
    - b) Macrophages
  - 2. Cells of inflammation
    - a) Basophils
    - b) Mast cells
    - c) Eosinophils
  - 3. Natural killer cells
- D. Inflammatory response
  - 1. Effects
    - a) Vasodilation
    - b) Attraction of phagocytes
    - c) Increased vascular permeability
    - d) Fibrinogen and complement involvement
  - 2. Local inflammation
  - 3. Systemic inflammation

## IV. Adaptive Immunity

- A. Cell recognition—antigens
  - 1. Foreign antigens
  - 2. Self antigens
  - 3. Autoimmune disease
- B. Origin and development of lymphocytes
  - 1. T cells
  - 2. B cells
- C. Activation and multiplication of lymphocytes

1. Antigen recognition
  - a) Processing of antigen
  - b) Presenting antigen and co-stimulation with MHC
  - c) Lymphocyte proliferation
- D. Antibody-mediated immunity
  1. Antibodies
    - a) Structure
    - b) Effects of antibodies
    - c) Antibody production
      - (1) Primary response
      - (2) Secondary response
      - (3) Plasma cells
      - (4) B memory cells
- E. Cell-mediated immunity
  1. Cytotoxic T cells
    - a) Cytokines (lymphokines)
    - b) Cell lysis
  2. T memory cells

(2)

#### V. Immune interactions

#### VI. Immunotherapy

- A. Vaccinations
- B. Monoclonal antibodies

#### VII. Acquired Immunity

- A. Active natural immunity
- B. Active artificial immunity
- C. Passive natural immunity
- D. Passive artificial immunity

#### VIII. Effects of Aging on the Lymphatic System and Immunity

#### IX. Systems Pathology - Systemic Lupus Erythematosus

### **RESPIRATORY SYSTEM**

#### I. Respiration

- A. Ventilation - movement of air into and out of the lungs
- B. Exchange of oxygen and carbon dioxide between the air in the lungs and blood
- C. Transport of oxygen and carbon dioxide in the blood
- D. Exchange of oxygen and carbon dioxide between the blood and tissues

#### II. Functions of the Respiratory System

- A. Gas exchange
- B. Regulation of blood pH
- C. Voice production
- D. Olfaction
- E. Innate immunity

#### III. Anatomy of the Respiratory System

- A. Upper and lower respiratory tracts
- B. Nose and nasal cavity
  1. External and internal nares
  2. Hard palate
  3. Conchae

- 4. Paranasal sinuses
  - 5. Nasolacrimal ducts
  - C. Pharynx
    - 1. Nasopharynx
  - 2. Soft palate
  - 3. Oropharynx
  - 4. Laryngopharynx
  - D. Larynx
    - 1. Thyroid cartilage
    - 2. Cricoid cartilage
    - 3. Vestibular folds and vocal cords
    - 4. Epiglottis
  - E. Trachea
  
  - F. Bronchi
  - G. Lungs
- lobules
- 2. Bronchioles
  - 3. Alveoli
    - a) Respiratory membrane
- H. Pleural cavities
  - I. Lymphatic supply

1. Lobes and

#### IV. Ventilation and Lung Volumes

- A. Changing thoracic volume
  - 1. Muscles of inspiration
  - 2. Muscles of expiration
- B. Pressure changes and air flow
  - 1. Changes in volume lead to changes in pressure
  - 2. Air flows from high pressure to low pressure
  - 3. Events of one respiratory cycle
- C. Lung recoil – elastic forces and surface tension
  - 1. Surfactant
  - 2. Pleural pressure
- D. Changing alveolar volume
- E. Pulmonary volumes and capacities
  - 1. Tidal volume (about 500 mL)
  - 2. Inspiratory reserve volume (about 3,000 mL)
  - 3. Expiratory reserve volume (about 1,100 mL)
  - 4. Residual volume (about 1,200 mL)
  - 5. Functional residual capacity (about 2,300 mL)
  - 6. Inspiratory capacity (about 3,500 mL)
  - 7. Vital capacity (about 4,600 mL)
  - 8. Total lung capacity (about 5,800 mL)
  - 9. Forces expiratory vital capacity

#### V. Gas Exchange

- A. Respiratory membrane thickness
- B. Surface area
- C. Partial pressure
  - 1. Diffusion of gases in the lungs
  - 2. Diffusion of gases in the tissues

#### VI. Gas Transport in the Blood

- A. Oxygen transport
  - 1. Hemoglobin and oxyhemoglobin (98.5%)



2. Dissolved in plasma (about 1.5%)
- B. Carbon dioxide transport and blood pH
  1. Bicarbonate ions (70%)
    - a) Carbonic anhydrase
    - b) Relate to blood pH
  2. Blood proteins (23%)
  3. Dissolved in plasma (7%)

#### VII. Rhythmic Ventilation (12-20 breaths per minute in adults)

- A. Respiratory areas in the brainstem
  1. Medullary respiratory center
    - a) Two dorsal respiratory groups
    - b) Two ventral respiratory groups
  2. Pontine respiratory group
- B. Generation of Rhythmic Ventilation
  1. Starting inspiration
  2. Increasing inspiration
  3. Stopping inspiration

#### VIII. Modification of Ventilation

- A. Nervous control of ventilation
- B. Chemical control of ventilation
  1. Medullary chemoreceptors
  2. Peripheral chemoreceptors
- C. Effect of exercise on ventilation
  1. Abrupt increase in ventilation
  2. Gradual increase in ventilation
  3. Aerobic threshold

#### IX. Respiratory Adaptations to Exercise

#### X. Effects of Aging on the Respiratory System

#### XI. Systems Pathology – Asthma

### **DIGESTIVE SYSTEM**

#### I. Functions of the Digestive System

- A. Take in food
- B. Break down the food
- C. Absorb digested molecules
- D. Provide nutrients
- E. Eliminate wastes

#### II. Anatomy and Histology of the Digestive System

- A. Mucosa layer
- B. Submucosa layer
- C. Muscularis layer
- D. Serosa layer (the adventitia)

#### III. Peritoneum

- A. Visceral peritoneum
- B. Parietal peritoneum
- C. Mesenteries – greater and lesser omentum
- D. Retroperitoneal organs

#### IV. Oral Cavity, Pharynx, and Esophagus

- A. Anatomy of the oral cavity
  - 1. Lips, cheeks, and tongue
  - 2. Teeth
    - a) Incisors
    - b) Canines
    - c) Premolars
    - d) Molars
  - 3. Palate and tonsils
    - a) Hard palate
    - b) Soft palate and uvula
    - c) Tonsils
  - 4. Salivary glands
    - b) Submandibular glands
    - c) Sublingual glands
- B. Secretions of the Oral Cavity
  - 1. Saliva
  - 2. Salivary amylase
  - 3. Lysozyme
  - 4. Mucin
- C. Mastication
- D. Pharynx and pharyngeal constrictors
- E. Esophagus
  - 1. Upper esophageal sphincter
  - 2. Lower esophageal sphincter (cardiac sphincter)
- F. Deglutition
  - 1. Voluntary phase
  - 2. Pharyngeal phase
  - 3. Esophageal phase: peristalsis

## V. Stomach

- A. Anatomy of the stomach
  - 1. Cardiac
  - 2. Fundus
  - 3. Body
  - 4. Pylorus
  - 5. Gastric pits and gastric glands
    - a) Mucous neck cells
    - b) Parietal cells
    - c) Endocrine cells
    - d) Chief cells
- B. Secretions of the stomach
  - 1. Chyme
  - 2. Mucus
  - 3. Hydrochloric acid
  - 4. Pepsinogen-pepsin
  - 5. Intrinsic factor
  - 6. Gastrin
- C. Regulation of stomach secretions
  - 1. Cephalic phase
  - 2. Gastric phase
  - 3. Intestinal phase
    - a) Secretin
    - b) Cholecystokinin
    - c) Gastric inhibitory polypeptide
- D. Movement in the stomach
  - 1. Mixing waves

## 2. Peristaltic waves

### VI. Small intestine

#### A. Anatomy of the small intestine

1. Duodenum
  - a) Circular folds, villi, and microvilli
  - b) Mucosal cells
    - (1) Absorptive cells
    - (2) Goblet cells
    - (3) Granular cells
    - (4) Endocrine cells
2. Jejunum
3. Ileum with Peyer's patches
4. Circular folds, villi, and microvilli
5. Ileocecal sphincter and ileocecal valve

#### B. Secretions of the small intestine

1. Peptidases
2. Disaccharidases

#### C. Movement in the small intestine

1. Peristaltic contractions
2. Segmental contractions

#### D. Absorption in the small intestine

### VII. Liver and Pancreas

#### A. Anatomy of the liver

1. Sources of blood
  - a) Hepatic artery
  - b) Hepatic portal vein
2. Ducts
  - a) Common hepatic duct
  - b) Cystic duct from gallbladder
  - c) Common bile duct
3. Liver histology
  - a) Hepatocytes
  - b) Bile canaliculi
  - c) Hepatic sinusoids

#### B. Functions of the liver

1. Bile secretion
2. Digestion
3. Excretion
4. Nutrient storage
5. Nutrient conversion
6. Detoxification of harmful chemicals
7. Synthesis of new molecules

#### C. Anatomy of the pancreas

1. Pancreatic islets
2. Acini

#### D. Functions of the pancreas

1. Exocrine
  - a)  $\text{HCO}_3^-$
  - b) Pancreatic enzymes
    - (1) Trypsin
    - (2) Chymotrypsin
    - (3) Pancreatic amylase
    - (4) Carboxypeptidase
    - (5) Lipases

- (6) Nucleases
- (7) Secretin
- (8) Cholecystokinin

2. Endocrine

VIII. Large intestine

A. Anatomy of the large intestine

- 1. Cecum
- 2. Colon
  - a) Ascending
  - b) Transverse
  - c) Descending
  - d) Sigmoid
- 3. Rectum
- 4. Anal canal
  - a) Internal anal sphincter – smooth muscle
  - b) External anal sphincter – skeletal muscle

B. Functions of the large intestine

- 1. Feces formation
- 2. Defecation
- 3. Mass movements
- 4. Defecation reflex

IX. Digestion, Absorption, and Transport

A. Carbohydrates

- 1. Digestive enzymes
  - a) Amylase (salivary & pancreatic)
  - b) Disaccharidases
- 2. Absorption
  - a) Monosaccharides
  - b) Secondary active transport

B. Lipids—triacylglycerol (triglycerides)

- 1. Digestion
  - a) Emulsification
  - b) Lipase
- 2. Absorption
  - a) Micelles
  - b) Chylomicrons
  - c) Cholesterol
  - d) LDLs and HDLs

C. Proteins

- 1. Digestion
  - a) Pepsin
  - b) Trypsin
  - c) Peptidase
- 2. Uptake by cells

D. Water and minerals

- 1. Ingestion
- 2. Secretion
- 3. Reabsorption
  - a) Water
  - b) Active transport of ions

X. Effects of Aging on the Digestive System

# Urinary System

## I. Functions of the Urinary System

- A. Excretion
- B. Blood volume control
- C. Ion concentration regulation
- D. pH regulation
- E. Red blood cell concentration
- F. Vitamin D synthesis

## II. Urinary System

### A. Kidneys

- 1. Renal capsule
- 2. Hilum of the kidney and renal sinus
- 3. Renal cortex and renal medulla
- 4. Renal pyramids and the calyces
- 5. Renal pelvis
- 6. The ureter
- 7. The nephron
  - a) Renal corpuscle
    - (1) Glomerulus
    - (2) Bowman's capsule
  - b) Filtration membrane
    - (1) Fenestrated capillaries
    - (2) Podocytes
  - c) Proximal tubule
  - d) Loop of Henle (nephronic loop)
    - (1) Descending limb
    - (2) Ascending limb
  - e) Distal tubule
  - f) Collecting ducts

### B. Arteries and veins

- 1. Renal arteries and veins
- 2. Interlobar arteries and veins
- 3. Arcuate arteries and veins
- 4. Interlobular arteries and veins
- 5. Afferent arterioles
- 6. Efferent arterioles
- 7. Peritubular capillaries and vasa recta
- 8. Juxtaglomerular apparatus

### C. Ureters, urinary bladder, and urethra

- 1. Trigone of bladder and urethra
- 2. Urinary sphincters
  - a) Internal urinary sphincter – smooth muscle
  - b) External urinary sphincter – skeletal muscle
  - c) Differences between the sexes

## III. Urine Production

### A. Filtration

- 1. Filtration membrane
- 2. Filtrate
- 3. Filtration pressure
  - a) glomerular capillary pressure
  - b) capsular pressure
  - c) colloid osmotic pressure

### B. Reabsorption

1. Water
  2. Proximal tubules
  3. Descending limb of loop of Henle
  4. Ascending limb of loop of Henle
  5. Distal tubules and collecting ducts
- C. Secretion

#### IV. Regulation of Urine Concentration and Volume

##### A. Hormonal mechanisms

1. Antidiuretic hormone (ADH)
  2. Renin-angiotensin-aldosterone
    - a) Renin and juxtaglomerular complex
    - b) Angiotensin I and II
    - c) Aldosterone
  3. Atrial natriuretic hormone
- B. Effect of sympathetic innervation on kidney function

#### V. Urine Movement—Micturition Reflex

#### VI. Body Fluid Compartments

##### A. Fluid compartments

1. Intracellular fluid compartment
2. Extracellular fluid compartment

##### B. Composition of the fluid in the body fluid compartments

##### C. Exchange between body fluid compartments

#### VII. Regulation of Extracellular Fluid Composition

##### A. Thirst

##### B. Ions

1. Sodium ions
2. Potassium ions
3. Calcium ions
  - a) Parathyroid hormone
  - b) Calcitonin
4. Phosphate and sulfate ions

#### VIII. Regulation of Acid-Base Balance

##### A. Buffers

1. Proteins
2. Phosphates
3. Bicarbonate

##### B. Respiratory system

##### C. Kidneys

##### D. Acidosis and alkalosis

1. Acidosis
  - a) Respiratory
  - b) Metabolic
2. Alkalosis
  - a) Respiratory
  - b) Metabolic

#### IX. Systems Pathology – Acute Renal Failure

### **Reproductive System**

## I. Functions of the Reproductive System

### A. Male

1. Production of sperm cells
2. Sustaining and transfer of sperm cells to the female
3. Production of male sex hormones

### B. Female

1. Production of female sex cells
2. Reception of sperm cells from the male
3. Nurturing the development of and providing nourishment for the new individual
  
4. Production of female sex hormones

## II. Formation of Sex Cells (Gametes)

### A. Meiosis – halves genetic material

1. Males results in 4 sperm cells
2. Females results in 1 secondary oocyte

### B. Fertilization restores full chromosome number

## III. Male Reproductive System

### A. Scrotum

### B. Testes

1. Seminiferous tubules
2. Interstitial cells
3. Efferent ductules
4. Sertoli cells

### C. Spermatogenesis

1. Spermatogonia
2. Primary spermatocytes
3. Secondary spermatocytes
4. Spermatids and sperm cells

### D. Ducts

1. Epididymis
2. Ductus deferens – vas deferens
3. Seminal vesicle and ejaculatory duct
4. Urethra

### E. Penis

1. Corpora cavernosa
2. Corpus spongiosum
3. Glans penis and external urethral orifice
4. Prepuce (foreskin)

### F. Glands

1. Seminal vesicles
2. Prostate gland
3. Bulbourethral glands (Cowper's Glands)

### G. Secretions

1. Semen is final result
2. Testicular secretions
3. Seminal vesicle secretions
4. Prostatic secretions

## IV. Physiology of Male Reproduction

### A. Regulation of sex hormone secretion

1. GnRH
2. FSH
3. LH - ICSH
4. Testosterone

- 5. Inhibition
- B. Puberty
- C. Effects of testosterone
  
- D. Male sexual behavior and the male sexual act
  - 1. Sensory impulses and integration
  - 2. Erection, emission, and ejaculation
  - 3. Male infertility
- V. Female Reproductive System
  - A. Ovaries
    - 1. Suspensory ligament
    - 2. Ovarian ligament
    - 3. Mesovarium
    - 4. Ovarian follicles
    - 5. Oocyte development and fertilization
      - b) Ovulation
      - c) Secondary oocyte
      - d) Fertilization
    - 6. Follicle development
      - a) Primordial follicles
      - b) Primary follicles
      - c) Secondary follicles
      - d) Mature (Graafian) follicles
      - e) Corpus luteum
  - B. Uterine tubes
  - C. Uterus
    - 1. Fundus
    - 2. Body
    - 3. Cervix
    - 4. Wall composition
      - a) Perimetrium (serous layer)
      - b) Myometrium
      - c) Endometrium
  - D. Vagina
  - E. External genitalia
    - 1. Vulva (pudendum) and vestibule
      - a) Labia minora
      - b) Clitoris
      - c) Prepuce
      - d) Vestibular glands
    - 2. Labia majora
    - 3. Mons pubis
    - 4. Clinical perineum and episiotomy
  - F. Mammary glands
    - 1. Development
      - a) Puberty
      - b) Sex hormone dependent
    - 2. Lactation
      - a) Modified sweat glands
      - b) Milk produced by alveoli
- VI. Physiology of Female Reproduction
  - A. Puberty
    - 1. Menarche
    - 2. Hormonal changes precede physical changes
  - B. Menstrual cycle



1. Menses
  2. Proliferative phase
  3. Secretory phase
  4. Premenstrual syndrome
- C. Menopause
1. Female climacteric
  2. Estrogen replacement therapy
- D. Female sexual behavior and female sexual act
1. Excitement, secretion, orgasm, resolution
  2. Female infertility- endometriosis

VII. Effects of Aging on Reproductive Systems

VIII. Systems Pathology – Benign Uterine Tumors