STUDY GUIDE - EXAM 3

Be able to identify the following respiratory system structures on a drawing and discuss their function:

- nasal, oral, & laryngeal pharynx
- tonsils - by name and location
- trachea
- right and left bronchi
- bronchioles
- structure of lungs, thoracic cavity, and mediastinum
- alveoli – distinguish between Type I and Type II alveolar cells (pneumocytes)
- diaphragm

Be able to define, describe physiological causes, and make distinctions between the following:

- tracheotomy
- tracheostomy
- diffusion gradients
- residual volume
- inspiration
- tidal volume
- expiration
- vital capacity
- pneumothorax
- neural control of breathing
- costal breathing
- chemical control of breathing
- diaphragmatic breathing
- gas laws
- oxygen transport
- carbon dioxide transport
- asthma
- function of RBC as transport mechanism
- carbonic anhydrase
- hemoglobin
- oxyhemoglobin
- bicarbonate
- carbaminohemoglobin
- chloride shift

Be able to:

- List the normal partial pressures of oxygen and carbon dioxide in arterial and mixed venous blood, and explain how they contribute to the exchange of gases.
- Describe the mechanisms of transport of oxygen and carbon dioxide in the blood, including the role of hemoglobin in the transport of both gases.
- Describe how changes in PO2 and PCO2 in lung tissues can alter ventilation.
- Explain the various effects metabolism has on hemoglobin.
• Explain the relationship between the $PCO_2$ of blood and the pH of blood. Describe the actions of carbonic anhydrase in erythrocytes as blood passes through the systemic and pulmonary circulations.

Discuss the anatomy of the digestive system, the individual parts of the digestive tube, and the peritoneum.

With a specified type of food (which may contain any of the four major types of organic molecules) be able to trace its movement through the digestive system giving:

1. The tissue layers of the anatomical part it passes through.
2. The control mechanism of each structure [including both nervous and chemical (hormonal and pH) controls of motility and enzyme release].
3. The enzymes in each part which will act on that food.

For example, trace the pathway of a piece of:
- Jello - composed of sugar and protein
- egg white - composed of protein
- potato - composed of starch
- etc.

Be able to identify the cells, glands, and organs which produce the various hormones and enzymes of digestion.

Describe what controls the production and release of the various hormones and enzymes involved in digestion.

Be able to identify the action of each digestive enzyme including:
- where the enzyme is found in the digestive tract
- optimal pH
- substrate
- product

Identify the digestive & absorptive functions that occur in each part of the digestive tube.

Discuss the roles of accessory digestive organs.

List, in order, the structures bile passes through from the hepatocytes to the duodenum.

Discuss in what form each type of organic molecule is absorbed and in what part of the digestive system the molecule is absorbed.
Distinguish between the form of lipid molecule absorbed into the lacteal and that absorbed into the capillaries.

Trace the fate of amino acids, monosaccharides, fatty acids, glycerol, and whole fats in the body, from the time of their absorption until they are used or stored.

In addition be able to label a diagram of the digestive system, including accessory organs.

Discuss the “hostile” environment of the stomach and the adaptations, which allow the stomach to deal with such an environment, including the effects of detergent like substances and aspirin.