

Human Physiology - Exam 3 Study Guide

The Blood

Circulatory system components

Blood components

Hemopoiesis - where? concept of stem cell differentiation

Rh and ABO blood types (problem-solving as we did in class)

Blood clotting, dissolution of clots and anticoagulants

Intrinsic vs. extrinsic pathways for the coagulation cascade

Steps in hemostasis

What two main molecules determine the pH of the blood? What controls those levels?

The Heart

Heart chamber and valve anatomy

Cardiac cycles, heart sounds, ECG wave forms

Phases of the cardiac cycle

Relationship between pressure and volume during one cardiac cycle

Electrical activity of the heart - intrinsic vs. extrinsic regulation

Compare pacemaker cells with the rest of the myocardia

Contractile events in myocardial cells (similarities, differences compared to skeletal muscle)

Excitation-contraction coupling and Ca^{++} induced Ca^{++} release

Atherosclerosis and cardiac arrhythmias (examples, risk factors)

“So What?” clinical topics discussed in class

Cardiac Output, Blood Flow, Blood Pressure

Basic structure, function of various vessel types in the body

Resistance vs. capacitance vessels

Basics of pressure, volume, flow and resistance - know principles and relationships

Mean arterial pressure - what factors contribute?

Venous return - how does it happen?

Blood volume - how does it affect blood pressure, etc.?

Exchange of fluid between capillaries and tissues - what drives it?

Poiseuille's law

ANS effects on control of blood flow

Blood pressure: what is it? how do we measure it? what contributes to it?

“So What?” clinical topics discussed in class

Respiratory Physiology

Functions, structure of respiratory system

Gas Laws: Boyle, LaPlace, Henry's, Dalton's - know either conceptually or in mathematical terms, whichever you prefer

Physical aspects of ventilation

Physical properties of the lung and airways and how those properties affect ventilation: compliance, elasticity, surface tension (and effects of surfactants), airway resistance

Mechanisms of breathing: inspiration, exhalation (quiet vs. deep)

Gas exchange in the lungs (how do gasses move?)

O₂ transport vs. CO₂ transport in the blood

Hemoglobin: function, loading reactions, types, dissociation curve

Hemoglobin vs. myoglobin (similarities / differences)

Regulation of breathing

Effects of blood pH and [CO₂] on ventilation rate

“So What?” clinical topics discussed in class