

Lecture 1: Cardiovascular 1

Consists of the Heart, Blood Vessels and Blood

Heart – Pump that creates the pressure to move the blood around the circulatory system

Blood Vessels – Takes substances to all parts of the body with rapid exchange ability

Blood – Carries substances around the body

Functions

Transport

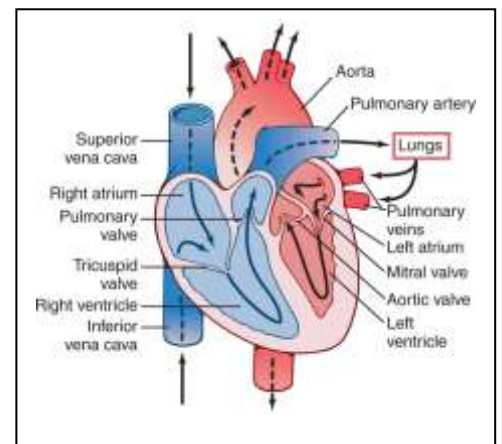
- O₂ and CO₂
- Nutrients to cells and Waste from cells
- Heat dispersal via vessel dilation/constriction
- Hormones

Protection

- Transports white blood cells
- Antibodies
- Blood clotting

Homeostasis

- Maintaining a consistent internal environment



Lungs > Pulmonary Vein > Left Atrium > Mitral Valve > Left Ventricle > Aortic Valve > Aorta > BODY > Vena Cava > Right Atrium > Tricuspid Valve > Right Ventricle > Pulmonary Valve > Pulmonary Arteries > Lungs

Left Side receives blood from lungs/pulmonary circulation and sends to the body/systemic circulation. **Left Ventricle is High pressure to ensure blood reaches extremities with a thick muscular wall.**

Right Side receives blood from the body/systemic circulation and sends to the lungs/pulmonary circulation. **Right Ventricle is Low pressure as only needs to push to lungs with a thin muscled wall.**

Pulmonary circulation carries blood between the heart and lungs

Systemic circulation carries blood between the heart and the body

Blood flow and valves are dependent on pressure changes

Lecture 3: Respiration 1

Respiration = internal respiration + external respiration

Internal respiration aka cellular respiration, mitochondria uses O₂ to generate ATP via oxidative phosphorylation, producing waste of CO₂ and H₂O

External Respiration is exchange of O₂ and CO₂ between atmosphere and cells

1. Pulmonary Ventilation
 - Movement on air in and out of lungs
2. Gas exchange in lungs
 - Gas move by diffusion from alveoli into capillaries
3. Transportation of O₂ and CO₂
 - Arteries away from heart and Veins towards heart
4. Gas exchange in tissues
 - Diffusion O₂ from capillaries into tissues, CO₂ out of tissues to capillaries

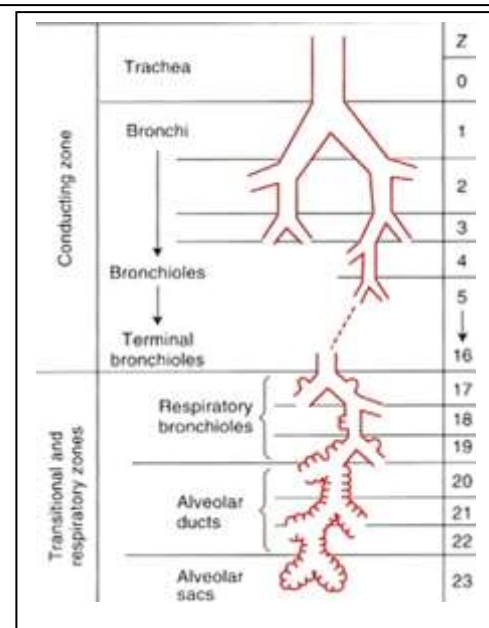
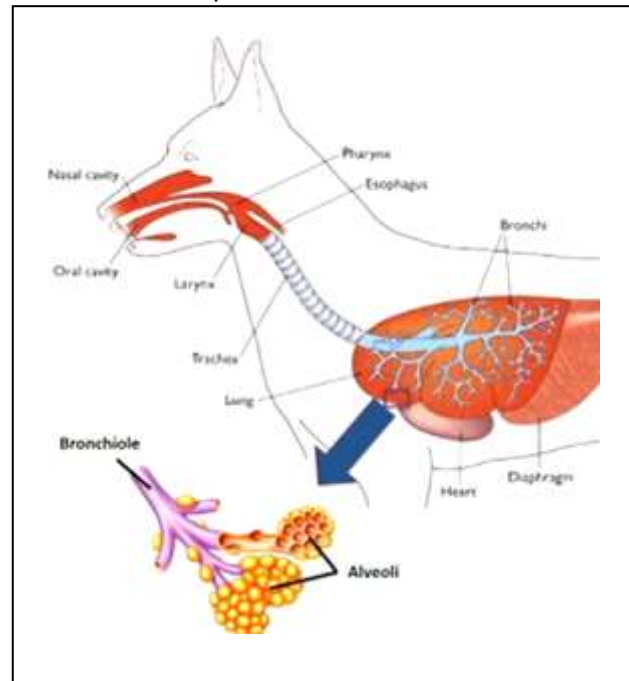
Anatomy of Respiratory System

Upper respiratory tract

- Nasal cavities
 - Clean the air- traps dirt
 - Warm the air – body temp
 - Moisten the air – saturates the air
- Oral cavity
 - Limits heating, warming and moistening
 - Useful for exercise
 - Useful in nasal obstruction
 - Panting for heat loss (dogs)
 - Some are obligate (horses)
- Pharynx
- Larynx
 - Made of cartilage, muscle and connective tissue
 - Patent airway
 - Stops food/water entering trachea
 - Vocalisation
 - Regulates airflow (widen/relaxes)

Lower respiratory tract

- Trachea
 - Into 2 Bronchi
 - Conducting zone
 - High resistance and velocity



Functions of Kidneys

Removing metabolic waste and foreign chemicals, ensuring body doesn't become toxic

Homeostatic functions regulate cells required for reactions within the body. Kidneys fine tune the quantities kept and excreted.

- Sodium: Nerve function and cellular function
- Potassium: Nerve function and cellular function
- Calcium: Enzymatic reactions and bone structure
- Hydrogen Ions and Bicarbonate: Acids and Bases for Buffer and pH levels

Endocrine Functions

- EPO for red blood cell production
- Vitamin D for Calcium level regulation

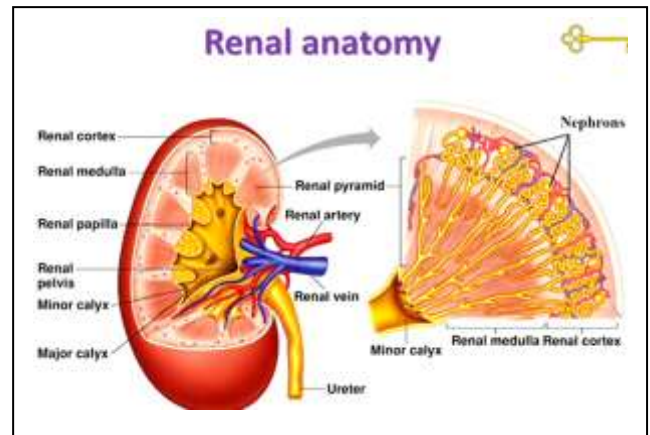
Renal Anatomy

Renal Artery: comes into kidney

Renal Vein: Blood leaves kidney

Minor Calyx: Where blood gathers and becomes urine

'Yellow squiggly lines' in right picture are Nephrons



Nephrons

Millions of Nephrons within kidneys

Afferent Arteriole > Capillaries > **Efferent** Arteriole

Renal Corpuscle: Glomerulus filters plasma through bowmans capsule into bowmans space

Renal Tubule: Can balance levels by adding substances to filtrate (from bowmans space) or removing them.

