

## MAJOR BLOOD VESSELS (SYSTEMIC CIRCUIT)

### MAJOR BLOOD VESSELS:

- 1) Aorta - receives blood from heart; sends to body.
- 2) Renal artery/vein - takes blood to/from Kidneys
- 3) Femoral artery/veins - brings blood to/from legs.
- 4) Subclavian arteries/veins - supplies blood to/from arms
- 5) Jugular vein - drains blood from head.
- 6) Carotid artery - supplies blood to head

## CIRCULATORY SYSTEM

Function: transports nutrients, oxygen, water to every cell and carries waste <sup>off</sup> away.

Main Organs: heart, veins, arteries, capillaries

## BLOOD VESSELS TYPES

### TYPES:

- 1) Arteries and Arterioles - carry blood away from heart
  - thick walls, high blood pressure
  - 3 LAYERS: inner epithelium, thick muscle layer, connective tissue
- 2) Capillaries
  - walls 1 cell thick, exchange of nutrients, O<sub>2</sub>, wastes
  - sphincters at either end control blood flow.
- 3) Veins and Venules - carry blood to heart
  - thin walls, low blood pressure
  - muscle contraction pumps blood, 1 way valves.

## BLOOD PRESSURE

\* the force exerted on the inner wall of blood vessel, ↓'s as you move further from heart.  
highest in arteries  
lowest in veins & capillaries

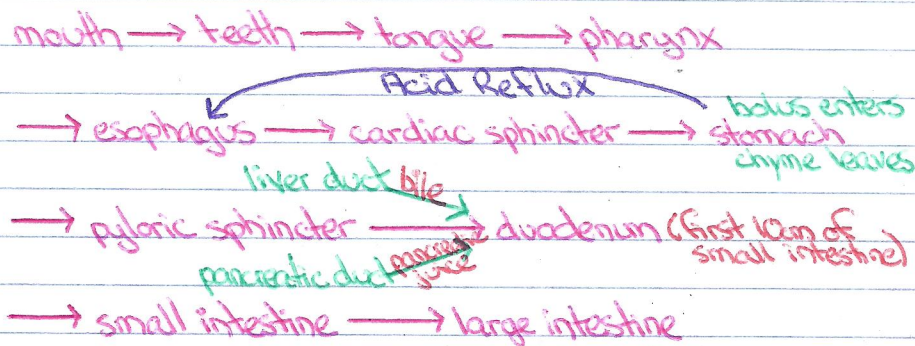
Systolic - BP when heart contracts

Diastolic - BP when heart relaxes.

Normal BP =  $\frac{120 \text{ mmHg systolic}}{80 \text{ mmHg diastolic}}$

## THE PATH OF FOOD

\* Saliva contains Salivary Amylase (begins carbohydrate digestion)



## GASTRIC JUICE

Components :

- 1)  $H_2O$  (solvent)
- 2)  $HCl$  (kills bacteria, pH 2)
- 3) Pepsinogen (begins protein digestion)
- 4) Mucous (protects stomach)

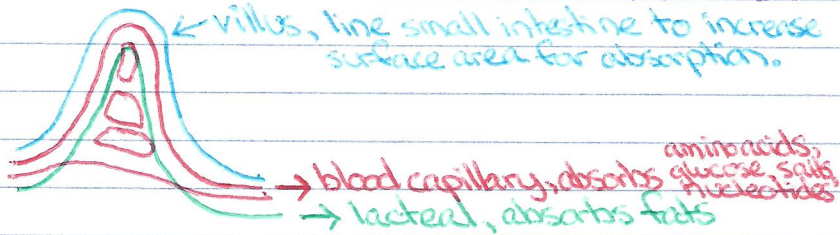
## LIVER FUNCTIONS

- 6 main functions:
- 1) detoxifies blood
  - 2) produces bile (stored in gallbladder)
  - 3) stores vitamins & minerals
  - 4) stores glucose as glycogen
  - 5) helps regulate blood sugar  
(receives signals from pancreas)
  - 6) removes bilirubin

## SMALL INTESTINE

### Digestive Enzymes:

- 1) Maltase - breaks down maltose
- 2) Peptidase - breaks down proteins
- 3) Nucleosidase - breaks down nucleic acids



## PANCREATIC JUICE

### Pancreas Regulates Blood Sugar:

- A. ↓ blood sugar - Insulin secreted, signals liver to store glucose.
- B. ↑ blood sugar - Glucagon secreted, signals liver to break down glycogen into glucose.

### Components:

- Digestive Enzymes
- 1) Sodium bicarbonate  
- raises pH of chyme
  - 2) Pancreatic Amylase  
- continues carbohydrate digestion
  - 3) Lipase  
- lipid (fat) digestion
  - 4) Trypsin  
- Protein digestion

## LARGE INTESTINE

- Functions:
- 1) Absorb water
  - 2) Vitamin production
  - 3) Store fecal matter until defecation

- ↳ Composed of
- 1) 40% bacteria
  - 2) 30% indigestible
  - 3) 20% fat
  - 4) 10% water

## ULCERS

→ breakdown in protective mucous lining of the stomach.

- CAUSES:
- 1) Overuse of anti-inflammatory
  - 2) Helicobacter Pylori infection

TREATMENT: antibiotics or acid reducing medications.

## DIGESTIVE SYSTEM ACCESSORY ORGANS

Accessory Organs:

- 1) Liver
- 2) Pancreas
- 3) Gall Bladder

Digestive System Functions:

- 1) breakdown nutrients
- 2) absorb nutrients
- 3) excrete indigestibles as waste

## BLOOD

Function: delivers  $O_2$  and nutrients,  
removes wastes

Composition: 1) 55% plasma

- water, salts, large proteins,  
gases, hormones

2) 45% blood cells

- red & white blood cells, platelets

produced in red bone marrow (skull, vertebrae, long bones, femur)

## BLOOD CELLS

### 3 TYPES:

- 1) Erythrocytes \* Anemia - lack of iron slows RBC production.  
- hemoglobin binds to  $O_2$  for transport  
- after 120 days, RBC's broken down by liver
- 2) Leukocytes 1) phagocytize - engulf  
- fight infection 2) release histamines - flush out  
and disease 3) produce antibodies - tag
- 3) Thrombocytes (platelets)  
- cell fragments involved in blood clotting.

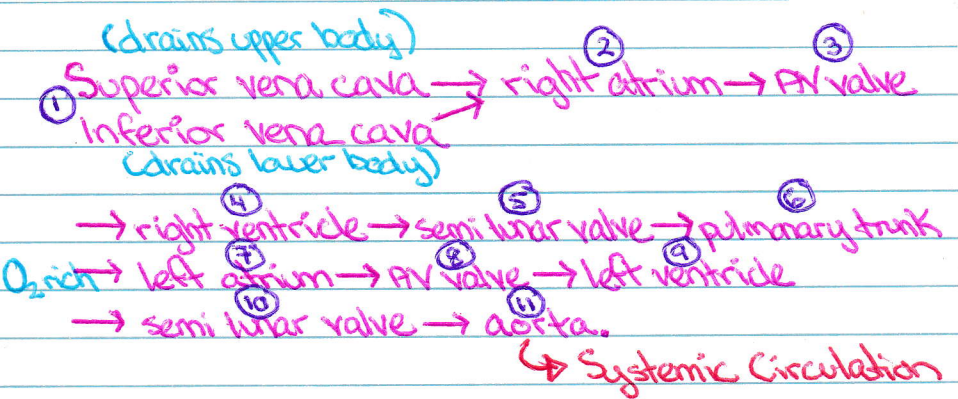
## INTERNAL STRUCTURE OF THE HEART

### Components:

- 1) 4 chambers - 2 atria & 2 ventricles
- 2) Septum - separate heart into right & left sides
- 3) AV valves - separate atria from ventricles
- 4) Cordae Tendinae - ligament attached to ventricle and to AV valve preventing backflow.
- 5) Semi-lunar valves - separate ventricles from arteries.

NOTE: left ventricle wall thicker b/c pumps  
blood to entire body.

## PATH OF BLOOD THROUGH THE HEART



## RESPIRATORY SYSTEM FUNCTIONS

### Function:

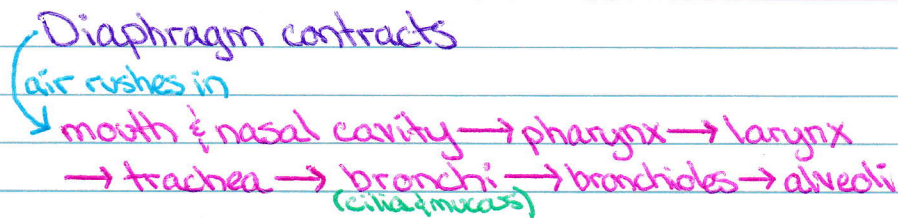
#### 1) External

- exchange of O<sub>2</sub> and CO<sub>2</sub> between air & blood.
- occurs in lungs

#### 2) Internal

- exchange of O<sub>2</sub> and CO<sub>2</sub> between blood & tissue fluid
- occurs in capillaries

## THE PATH OF AIR



## ALVEOLI STRUCTURE

### STRUCTURE:

- 1) Clustering shape - increases SA for gas exchange.
- 2) Thin walls - fast diffusion of  $O_2$  and  $CO_2$
- 3) Covered in capillaries - greater blood volume exposed to  $O_2$
- 4) Surfactant - prevents walls from sticking together.
- 5) Moist inner walls - diffusion of  $O_2$  and  $CO_2$  faster
- 6) Stretch receptors - prevents walls from bursting.

## TIDAL VOLUME

→ normal amount of air inhaled and exhaled while a person is resting.

→ minimum amount of  $O_2$  the body requires

\* When  $O_2$  requirements ↑, tidal volume ↑.

## VITAL CAPACITY

→ maximum volume of air a person can inhale and exhale.

Average 3-5L

Depends on:

- 1) body mass

- 2) gender (10-20% lower in females)

- 3) fitness (20-30% greater in athletes)

## RESIDUAL VOLUME

---

→ amount of air remaining in lungs after exhalation.

Average 1L