I. Muscular System

A. Specialized tissue that does one thing: shorten.

Why is a muscle considered an organ?

*a muscle is made from several different types of tissue: ← connective, epithelial, nerve, etc.

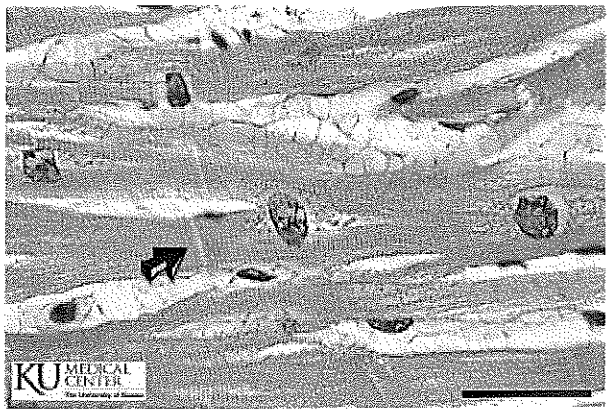
Discuss the 4 major functions of muscles.

B. Functions:

1. Movement (of body, blood, food, etc.).
2. Stabilize joints.
3. Posture (tiny adjustments so you don't fall down).
4. Heat generation (75% of muscle energy lost as heat)

C. Three muscle types:

1. Cardiac Muscle
   a. Only in heart
   b. Moves blood
   c. One nucleus per cell
   d. Involuntarily controlled
   e. Striated (banded appearance)
   f. Cells synchronize

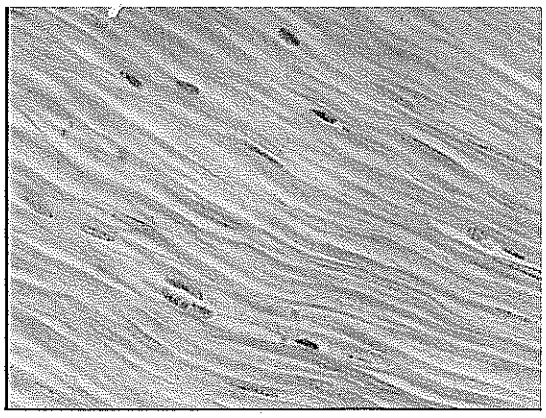


striated?
# of nuclei?

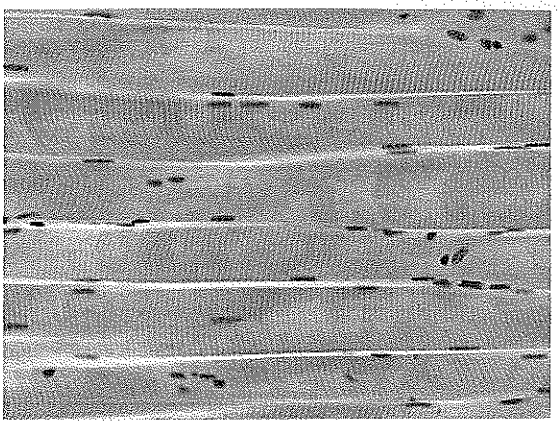
Describe the similarities and differences in the structure and function of the three types of muscle tissues and indicate where they are found in the body.

voluntary/involuntary?

2. Smooth Muscle
   a. Walls of hollow organs.
   b. Move food & wastes.
   c. No striations.
   d. One nucleus per cell.
   e. Cells synchronize to produce "peristaltic waves".
   f. Involuntarily controlled slow contractions.



3. Skeletal Muscle



a. Attached to bone.

b. Move entire body.

c. Striated & multinucleate.

d. Voluntarily controlled

e. Skeletal muscles to know (see figs 6.20 & 6.21):

Muscles to Know (p182&184)

Anterior (p182)

- **Temporalis**
- **Frontalis**
- **Masseter**
- **Orbicularis oris**
- **Orbicularis oculi**
- **Sternocleidomastoid**
- **Platysma**
- **Deltoid**
- **Pectoralis major**
- **External intercostals**
- **Biceps**
- **Rectus abdominis**
- **External oblique**
- **Quadriceps group**
- **Tibialis anterior**

Posterior (p184)

- **Trapezius**
- **Triceps**
- **Latissimus dorsi**
- **Gluteus maximus**
- **Hamstring group**
- **Gastrocnemius**

What is the pneumonic for naming muscles? What does each letter stand for? Give an example of a muscle named for each criteria.

D. Criteria for Naming Muscles: LADSNORE

1. **L**ocation — Rectus (Abdominus) — on abdomen
2. **A**ction — (Rectus) Abdominus
   → help us stand erect
3. **D**irection of Fibers — External Oblique → means "diagonal"
4. **S**hape — Deltoid ("triangle" shaped)
5. **N**umber of Origins — Biceps (2 origins)
6. **O**rigin & Insertion — Sternocleidomastoid
   origin sternum; origin clavicle; insertion on mandible
7. **R**elative Size
   Gluteus Maximus → larger than gluteus minimus

E. Muscle Groupings

1. Muscles usually occur in pairs b/c can only pull.
2. Let's use arm curls as an example:
3. Prime Mover & Antagonist

prime mover

a. Prime Mover – the muscle responsible for most of a movement.

EX) bicep

antagonist

b. Antagonist – the muscle that does the reverse action of the prime mover.

EX) Tricep

synergist

4. Synergist – muscles that help the prime mover.

EX) other smaller upper arm muscles

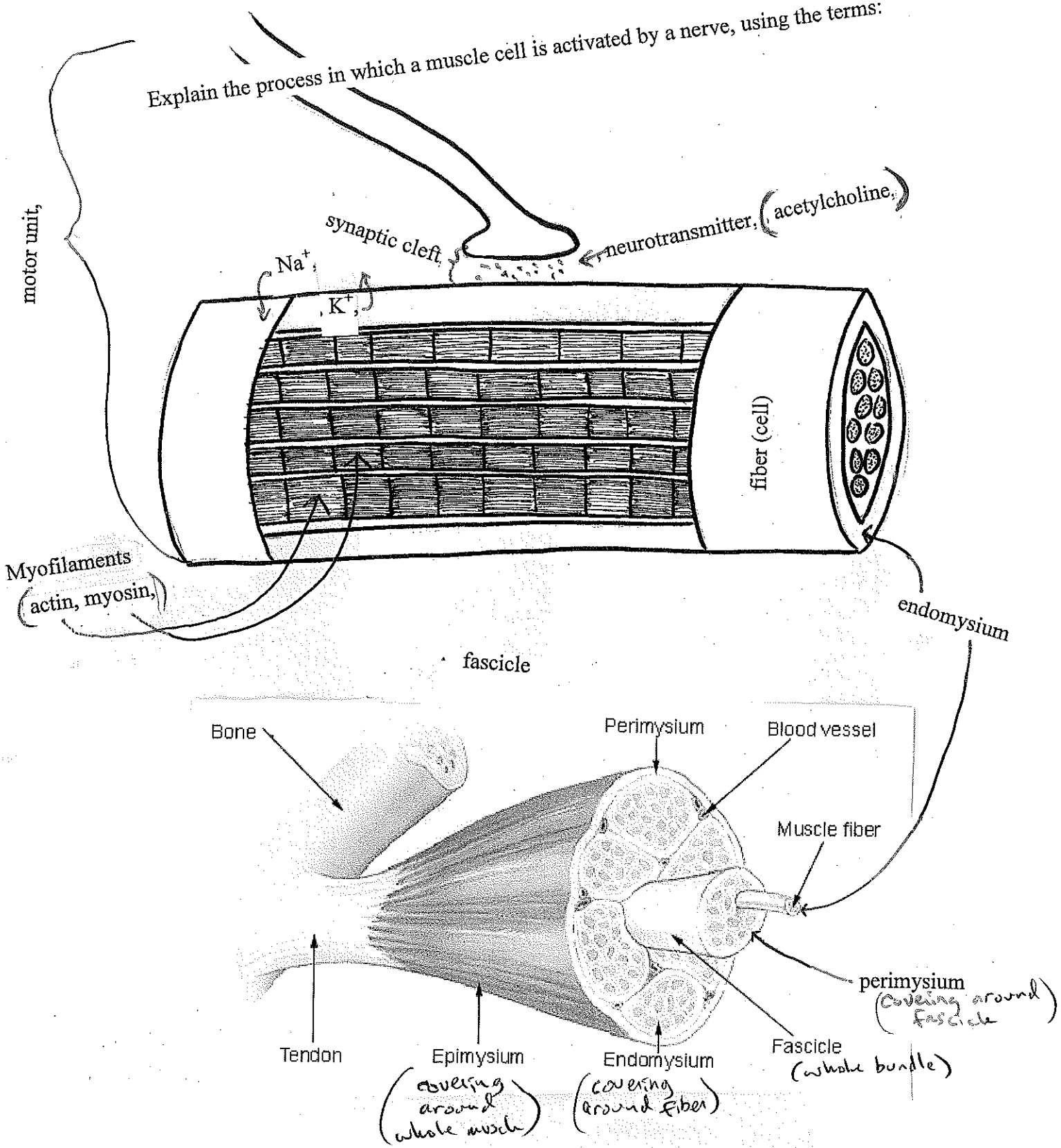
fixator

5. Fixators – specialized synergists that stabilize joints and/or muscle origins to prevent unnecessary movement.

EX) muscles of back, abdomen, shoulders

II. Muscle Contractions

A. Motor Unit – one nerve and the muscle cells that it stimulates



B. Types of Contractions

1. Isotonic Contractions

isotonic exercise

- Successful muscle shortening when stimulated by a nerve.
- Results in movement.
- EX) walking, lifting, etc.

2. Isometric Contractions

isometric exercise

- Muscles do not shorten when contracting.
- No movement.
- Pushing against wall, lifting a bus, etc.

Discuss the major differences between aerobic and anaerobic exercise, and identify each stage on a graph. (For instance: energy use, waste products, stamina, power, etc)

C. Contractions and Oxygen Use

1. Aerobic Muscle Contractions

aerobic contraction

- Glucose breakdown that uses oxygen.
- Glucose use is efficient.
  - 1 glucose molecule completely broken down into 36 ATP's
- Light exercise.

anaerobic contraction

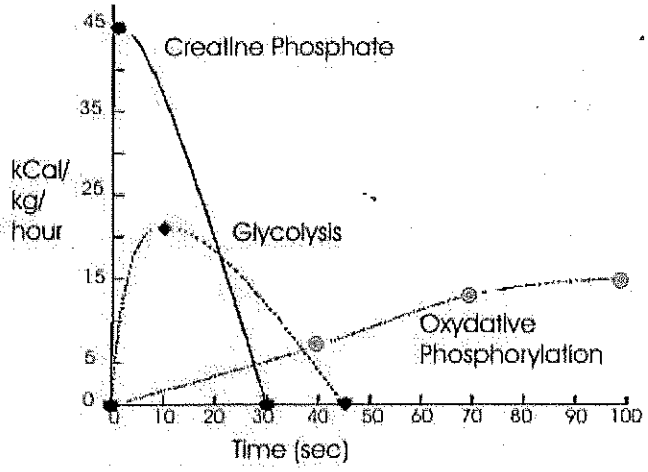
2. Anaerobic Muscle Contractions

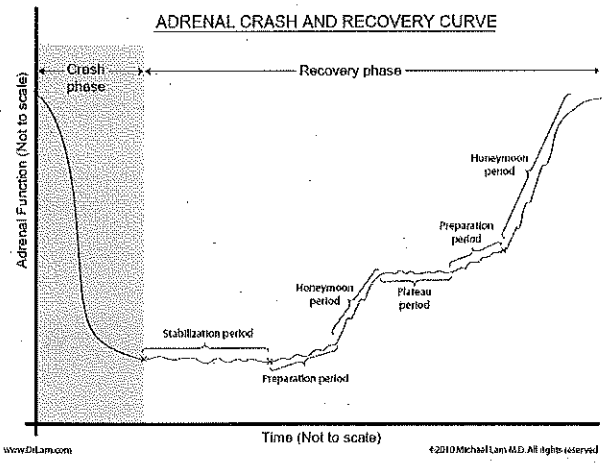
- Glucose breakdown that does not use oxygen.
- Glucose use is inefficient:
  - 1 glucose yielding only 2 ATP's
  - Excess glucose turned into lactic acid
- About 2.5 times faster than aerobic contractions.
- Fatigued after 30-40 seconds.

fatigue
muscle fatigue

B. Fatigue

1. The inability for a muscle cell to contract despite being stimulated to do so by a nerve.
2. Happens when muscles are over-worked.
3. Caused by a lack of oxygen, insufficient ATP, and a buildup of lactic acid.





What is the difference (in terms of muscle cell activation) between strong and weak muscle contractions?

the # of muscle cells being stimulated

III. Changes to Muscle Size

A. Muscle Tone – skeletal muscles are always in a state of mild contraction, even when "relaxed".

- Maintains posture.
- Keeps them ready for contraction.

Define and give the causes of hypertrophy and atrophy. next page

B. Hypertrophy – increase in muscle size.

1. Increased number of fibers, connective tissue and blood vessels in response to prolonged forceful muscle activity.
2. Occurs if muscle contracts to at least 75% of its maximum tension.
3. Fast & Slow Twitch Muscle Fibers

Distinguish between fast-twitch and slow-twitch muscle fibers.

a. Slow-Twitch Muscle Fibers:

- Steady tug
- High endurance
- Aerobic energy use
- Much globin, mitochondria, blood vessels give a dark color.

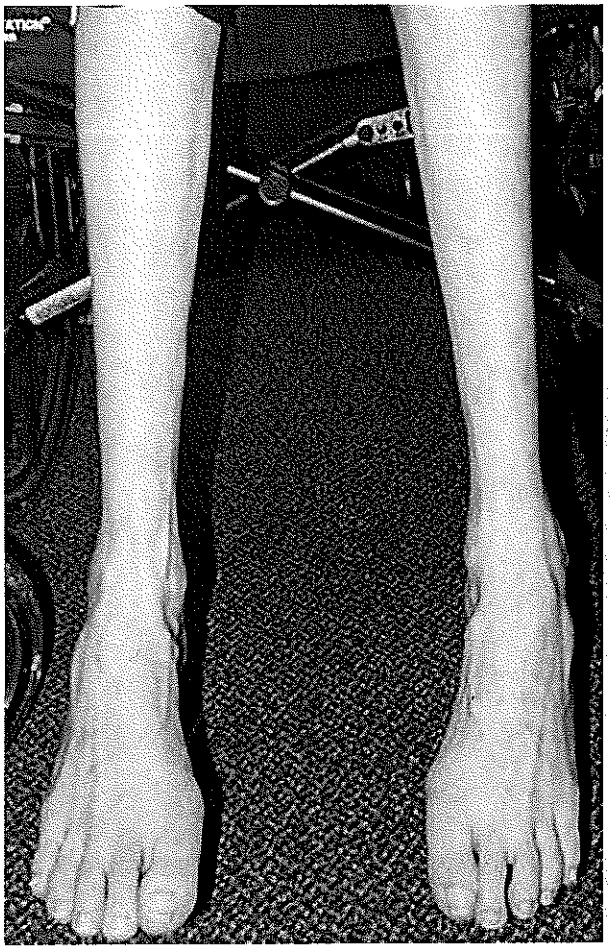
b. Fast-Twitch Muscle Fibers:

- Explosive movements
- Fatigue quickly
- Anaerobic energy use
- Less globin, mitochondria, blood vessels give a lighter color

atrophy

C. Atrophy – decrease in muscle size

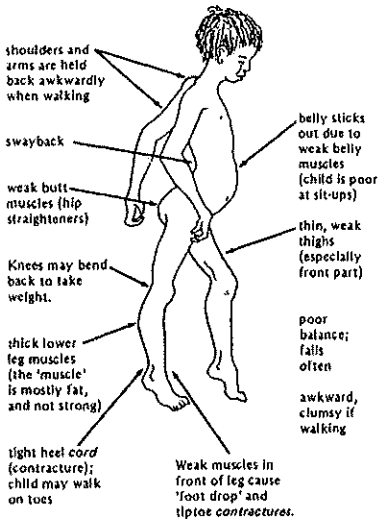
1. Results from prolonged lack of use
2. Causes:
    a. Temporary – cast limb, long bed rest, space travel, etc.



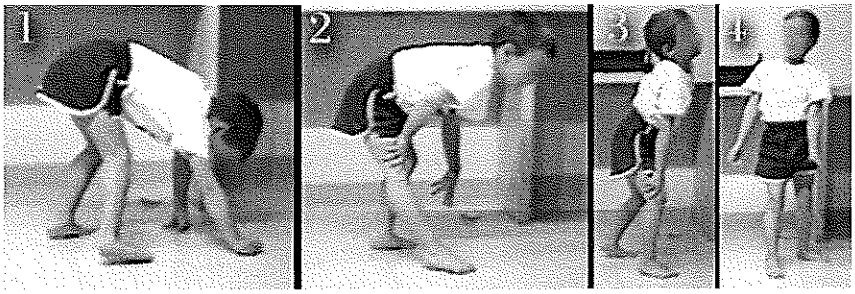
b. Permanent

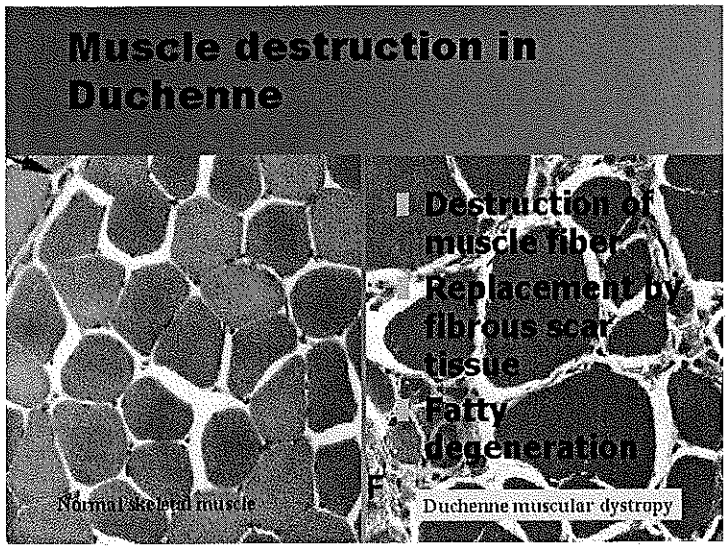
- Nerve injuries
- Disease
    - Muscular Dystrophy
        - congenital (inherited) disorder
        - muscle fibers slowly destroyed and replaced by scar tissue.

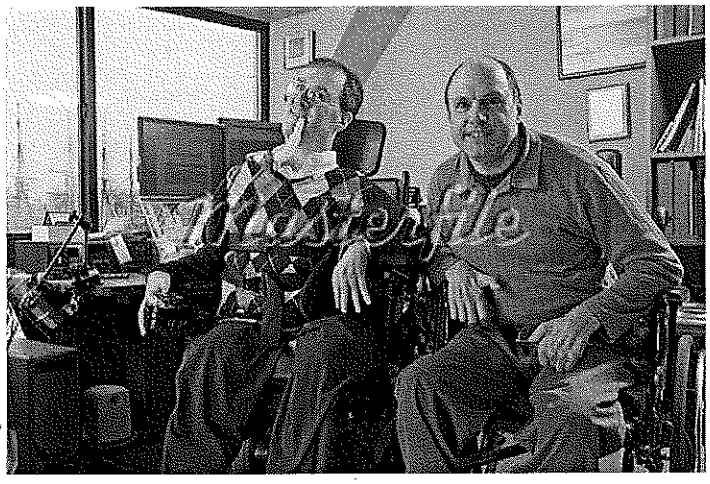
FYI:
Diseases and permanent injuries are uncommon in the muscular system because of the massive amount of blood flow to muscles.



- Diagnosed b/w 2-6 years of age (mostly boys).
- Lose ability to move.
- Usually pass away by early adulthood.



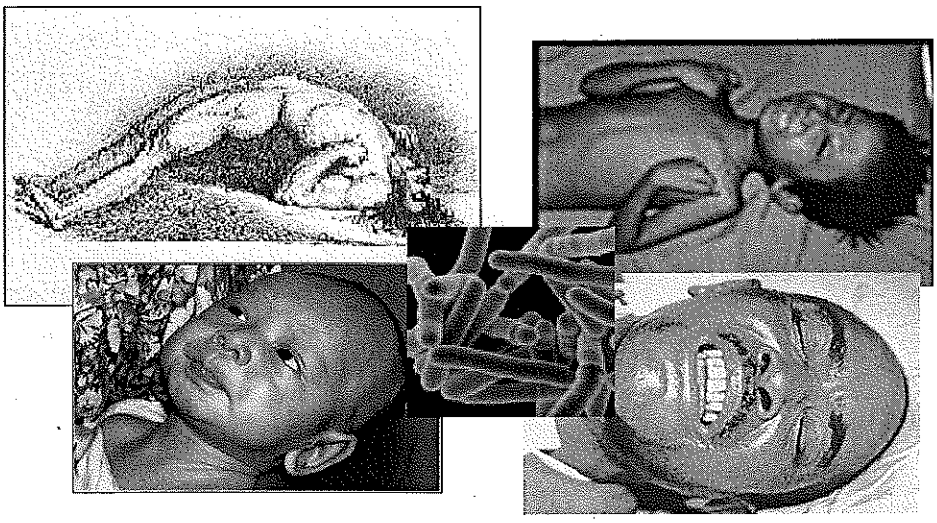


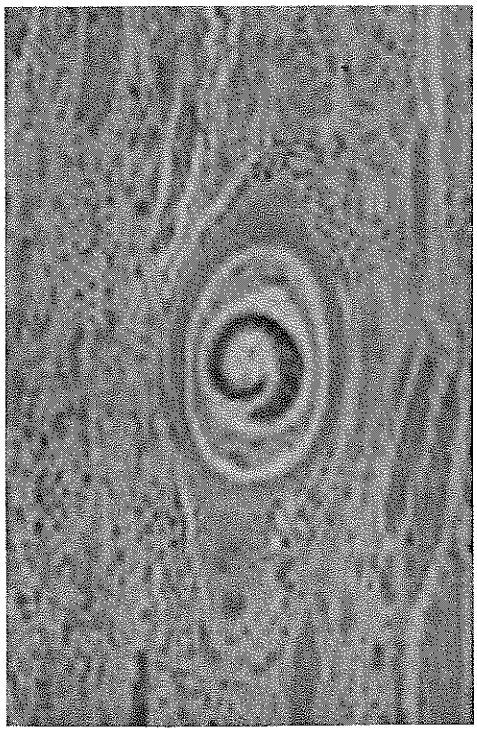


- Fibromyalgia
  - congenital (inherited) disorder
  - constant aches, pains, stiffness and tenderness in muscles.
  - cause unknown, but possibly low pain threshold in brain resulting in increased sensitivity.
  - mostly females (90%) under 40 years of age.

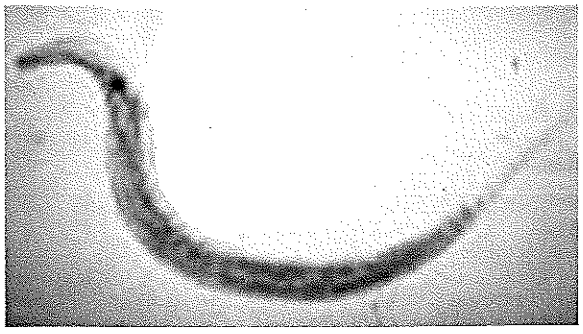
tetanus

- Tetanus
  - Disease (caught, not inherited)
  - Constant contraction of all muscles.
  - Caused by toxin (tetanospasmin) produced by a certain bacterium (*Clostridium tetani)*.
  - Not transmitted b/w individuals.
  - Death from respiratory arrest.





- Trichinosis
  - Parasitic worm embeds in skeletal muscle.
  - Intense pain and weakness.
  - Source: undercooked pork.



The Digestive System

I. Interesting Factoids

A. You eat about 1,100 pounds of food a year.

B. You produce about 1.7 liters of saliva each day.

C. Your stomach can hold about 1.5 liters of food.

D. About 12 liters of food passes through your digestive system each day, but only 100mL is lost as feces.

E. You've got about 400 species of bacteria in your colon.

F. The stomach digests all of its contents in 2-6 hours.

G. The volume of an individual flatus is 15-35 mL.

H. Most people pass about 200-2,000mL of gas a day in 13-14 passages.

I. Farts are composed of O_2, N_2, CO_2, H_2 and CH_4 (methane)

1. What are the 4 main functions of the digestive system?

II. Functions:

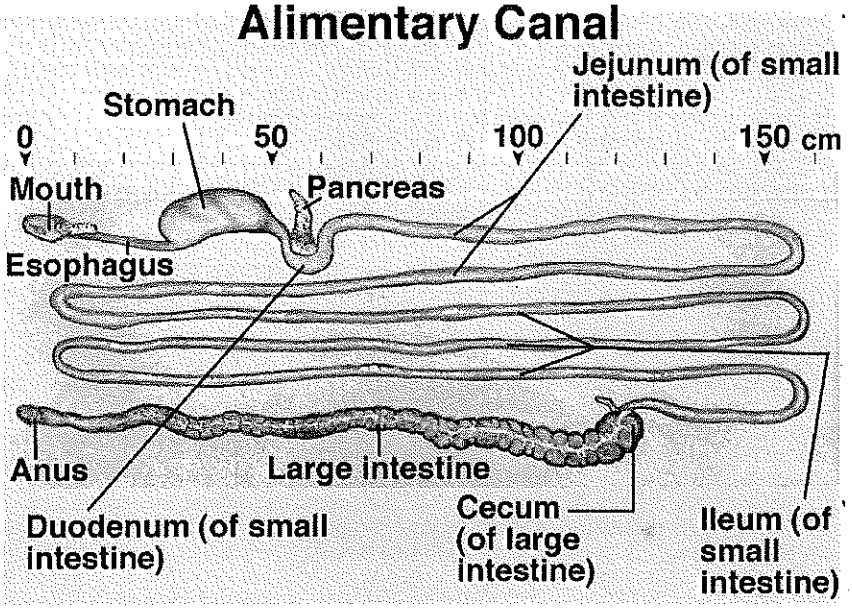
The DIGESTIVE & EXCRETORY SYSTEMS

STRUCTURES IN THIS SYSTEM	FUNCTIONS OF THIS SYSTEM	HOW THIS SYSTEM HELPS OUR BODIES MAINTAIN HOMEOSTASIS
Oral Cavity Esophagus Stomach Small Intestine Liver Gall Bladder Pancreas Large Intestine Rectum Anus	**Ingestion** taking in food **Digestion** breaking down food **Absorption** getting nutrients into the bloodstream	Provides the blood with the nutrients that it needs to feed all of the cells in our body. Removes harmful metabolic wastes from the body.
Kidney Urinary Bladder Urethra	**Excretion** rid of indigestible wastes	Fluid balance.

III. Major Divisions (2)

A. Alimentary Canal (aka. Gastrointestinal Tract)

1. Long tube that runs through body
2. Digestion & Absorption of food



B. Accessory Digestive Organs

1. Aid digestion chemically and/or mechanically
2. Pancreas, Liver, Gall Bladder, Salivary Glands, Teeth

2. Into what two main regions is the digestive system divided?

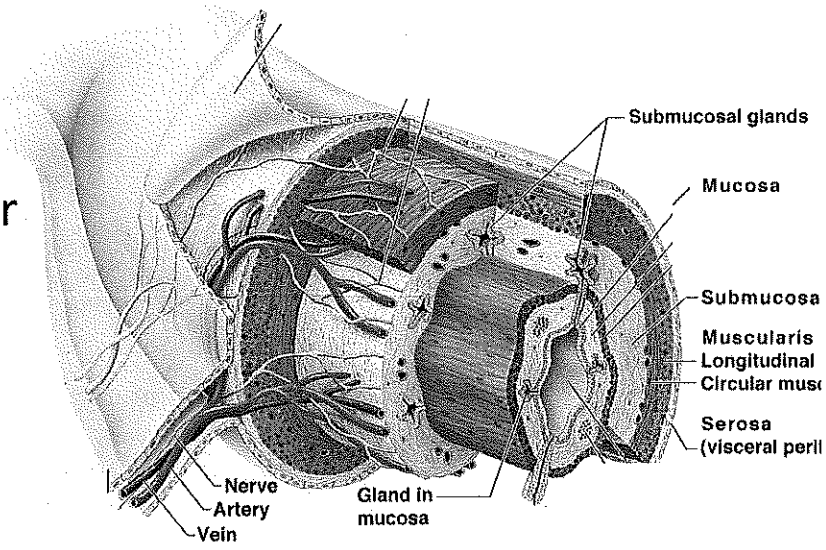
Assn: Digestive System Packet #1(p.239) & 2(p.240)

3. What are the 4 basic layers the make up the walls of the alimentary canal, anywhere from the throat to the rectum?

V. Structures of the Alimentary Canal (fig 14.3/p415)

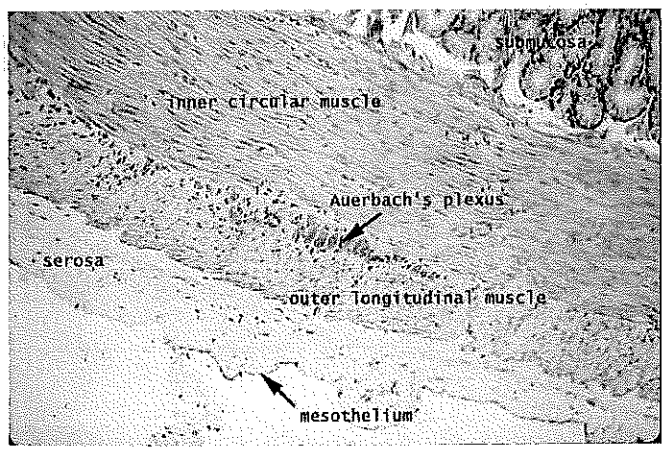
A. Four basic tissue layers from esophagus - large intestine

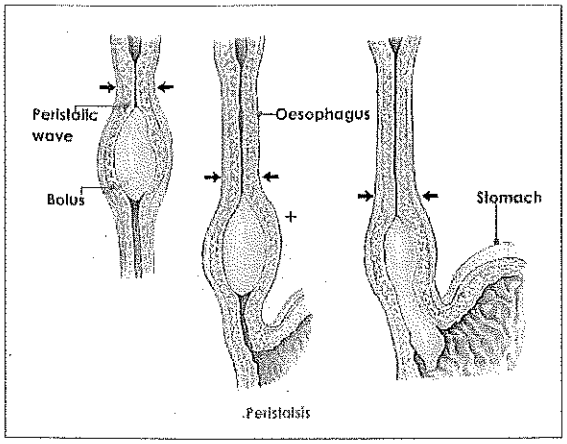
1. Mucosa
   a. Inside layer
   b. Simple columnar epithelium



2. Submucosa
   a. Beneath mucosa
   b. Soft connective tissue
   c. Blood vessels, nerve endings, lymph structures for nutrient absorption

3. Muscularis Externa
   a. Circular & longitudinal smooth muscle
   b. <u>Peristalsis</u>





4. Serosa
    a. Outermost layer
    b. Single layer of fluid-producing cells

I. Quick Trip through the Alimentary Canal

A. Mouth (oral cavity)
1. analysis, lubrication, mechanical & chemical digestion
2. amylase – enzyme that starts to break down carbs
3. tongue mixes food & saliva
4. portion of swallowed food called a "bolus"

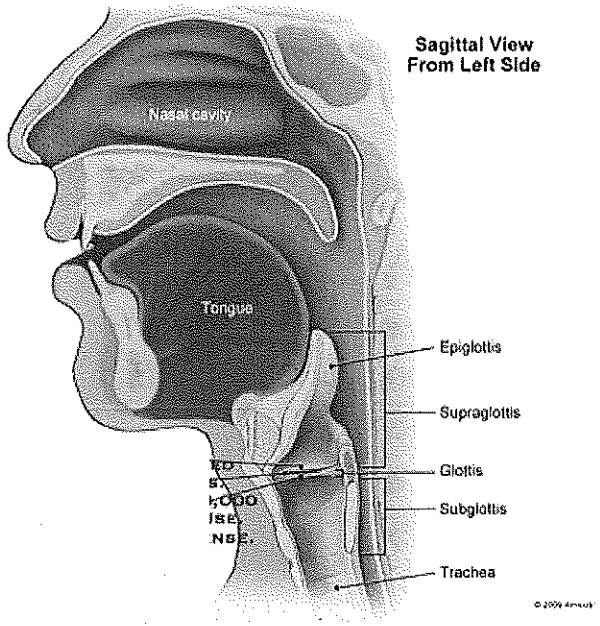
4. In which regions of the digestive system does mechanical digestion happen?

(1) Mouth - teeth masticate (grind up) food
(2) stomach - churns (mixes up) food

16. What is peristalsis and where does it begin?

B. Pharynx

1. back of throat before splitting into esophagus & trachea
2. common passageway for food, fluid, air
3. peristalsis begins here

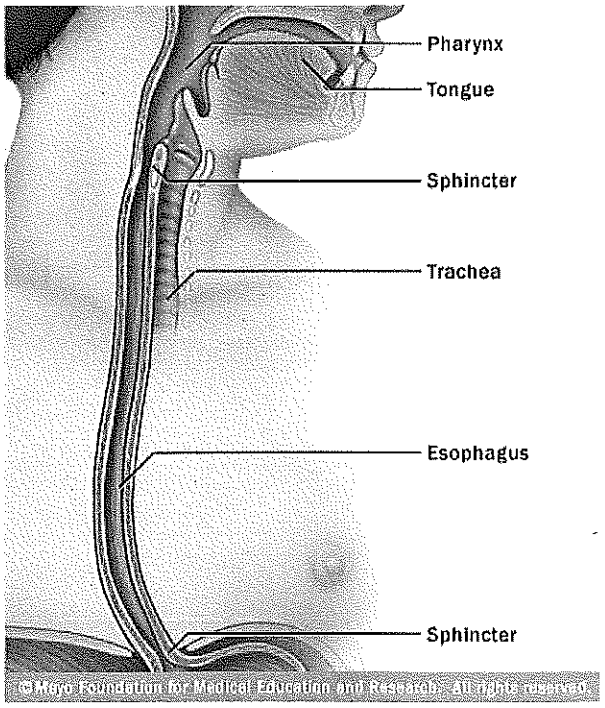


C. Glottis & Epiglottis

1. glottis – opening to larynx (windpipe)
2. epiglottis – flap of cartilage that covers glottis during swallowing to prevent choking.

D. Esophagus

1. 10-inch stretchable tube to stomach.
2. cardiac sphincter muscle at end closes off stomach.

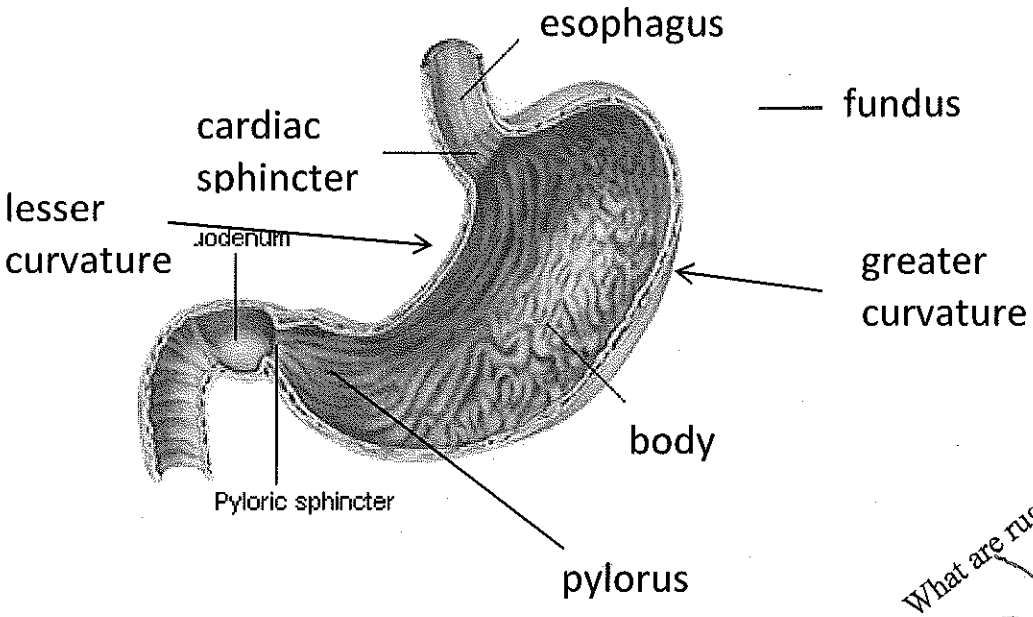


P452 MC #5,9 / SAE #4-6

A. Stomach

1. Storage area for mixing and digesting food.
2. Regions of the stomach:

5. Draw and label the stomach and its regions.



6. What are rugae for?

3. Folds in inner stomach lining called "rugae" increase the surface area for nutrient absorption.

4. Third layer of oblique muscle to mix food better.

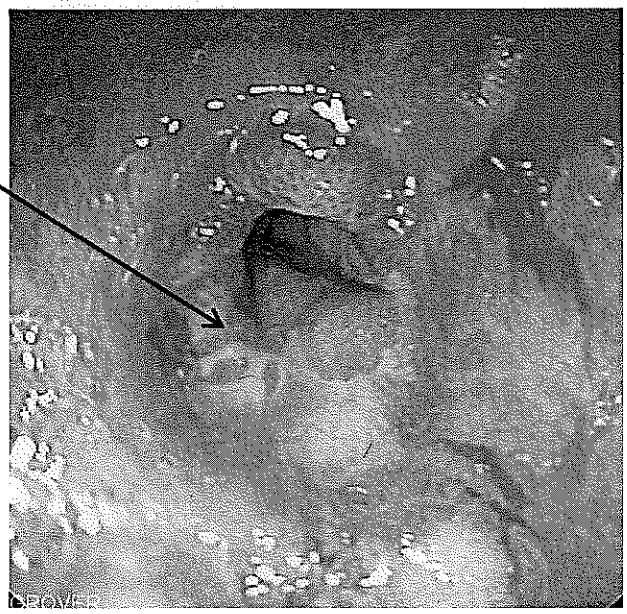
7. What is "gastric juice" and "chyme"?

5. "Gastric Juice"
   a. 2-3L/day
   b. Break food down into "chyme"

c. Mix of chemicals:

- HCl – acidic environment activates enzymes
  -stomach lined with mucous for protection
- Pepsin – enzyme that digests most proteins.
- Rennin – digests milk proteins.

6. Gastrointestinal Reflux Disease
   a. Stomach contents leak into esophagus.
   b. Can cause a stricture.
   c. Treat with proton-pump Inhibitor (PPI) drugs.
      EX) Prilosec



7. Vomiting
   a. Your body's way of getting rid of something it doesn't like.
   b. From sickness or self-induced
      - From sickness:
        1) Nausea Phase – that queasy feeling
        2) Retching Phase – abdominal muscles and diaphragm contract a few times.
           - increased salivation to protect tooth enamel.
        3) Expulsive Phase – deep breath, then epiglottis closes.
           -retroperistaltic waves begin
           -abs contract violently
           -decreased abdominal pressure and released endorphins lead to feeling of relief.

      - Self-Induced (gag reflex)
        - Sensory nerves in back of throat (pharynx) send message to brain stem.
        - Message sent back to start at step #3.

8. Hunger & Satiation

a. Hunger – the trigger to eat:

Decreased blood sugar levels

↓

Increased production of certain hormones

↓

Hormones cause stomach to contract
("hunger pangs")

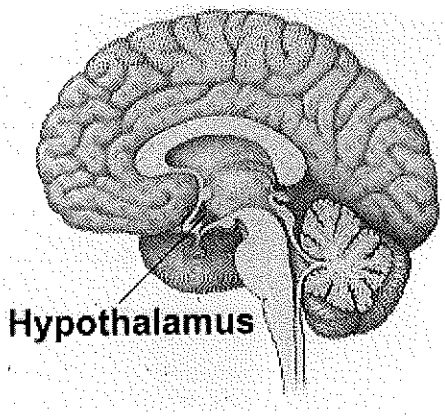
b. Satiation – the trigger to stop eating:

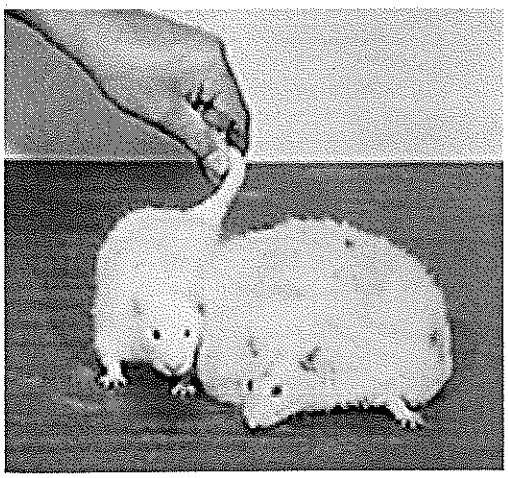
Stretch receptors
In stomach

blood chemistry
(sugar, insulin, fats)

↘ ↙

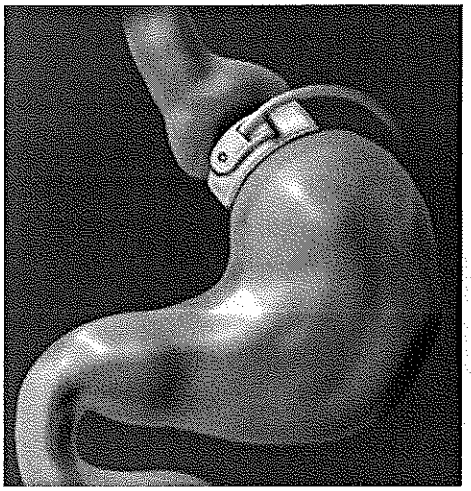
Hypothalamus



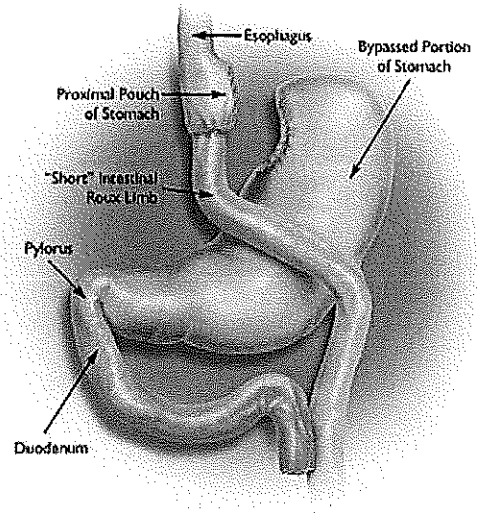


9. Bariatric Surgeries

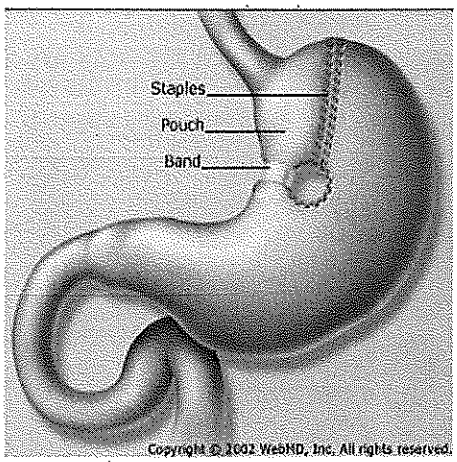
Gastric Band



Gastric Bypass



Stapling



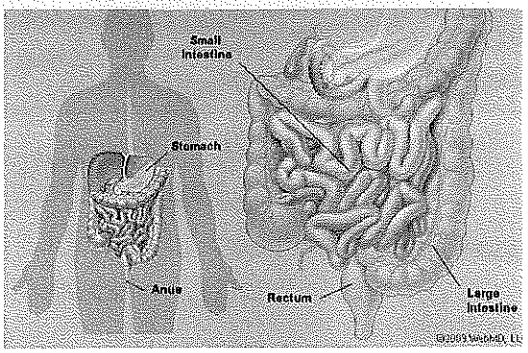
10. Identify and describe all of the sphincter muscles (valves) in the alimentary canal.

* cardiac sphincter – b/w esophagus + stomach
  – prevents food/acid from entering esophagus

* pyloric sphincter – b/w stomach + sm. int.
  – retains food until ready to be released into intestine

* Internal anal sphincter – involuntary

* External anal sphincter – voluntary
  "the greatest defender of human dignity"

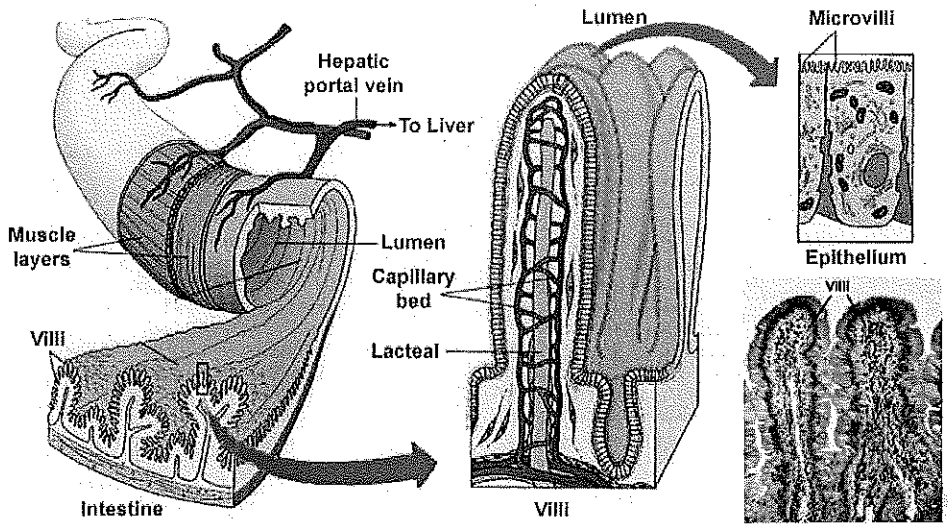


A. Small Intestine

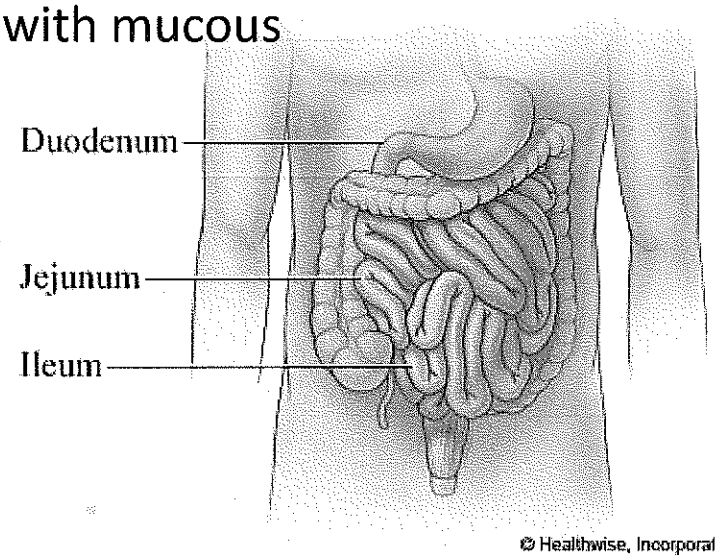
1. 22-23 feet long / 1 inch diameter
2. Final digestion
3. Most of the nutrient absorption

*villi (tiny fingerlike projections) increase the surface area to absorb more nutrients.

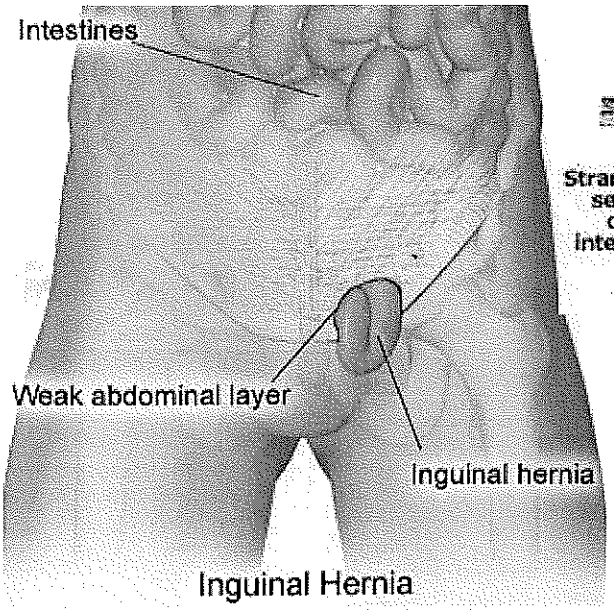
8. *Villi: what are they, where are they, what do they do?*



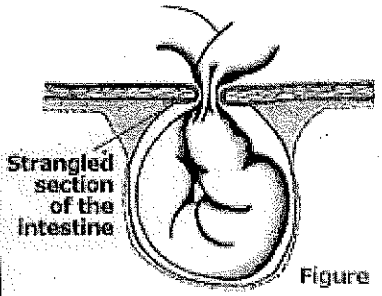
4. Three subdivisions of the small intestine:
   a. Duodenum
      - Neutralizes stomach acid
      - Receives from gall bladder and pancreas
      - Coats chime bolus with mucous
   b. Jejunum
      - specific nutrient absorption
      - Coated with villi
   c. ileum
      - Final absorption



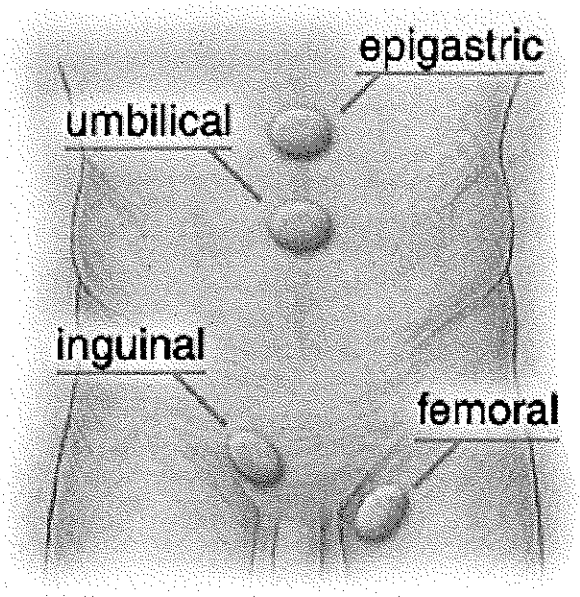
5. Common Disorders: Hernia



Inguinal Hernia

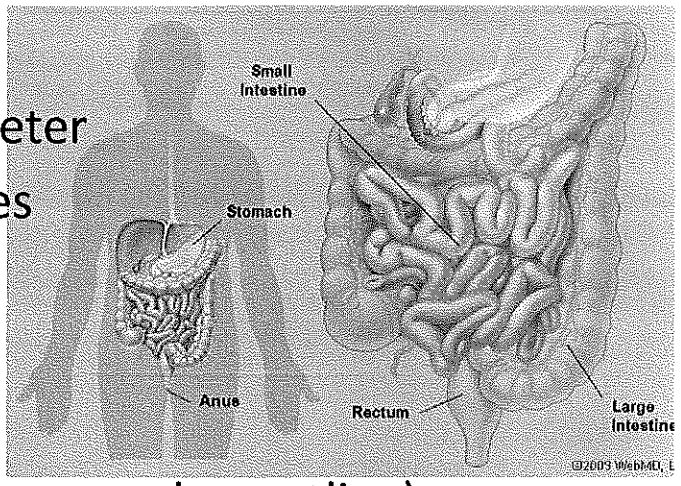


Figure



9. What are the 5 regions of the large intestine?

B. Large Intestine



1. 5 feet long / 3 inches diameter
2. Dries out indigestible wastes
3. Five subdivisions:
   a. Cecum
   b. Appendix
   c. Colon (ascending, transverse, descending)
   d. Rectum
   e. Anal canal
      - Involuntary internal sphincter (smooth muscle)
      - Voluntary external sphincter (skeletal muscle)
4. Common Disorders: Diarrhea, Constipation, Appendicitis

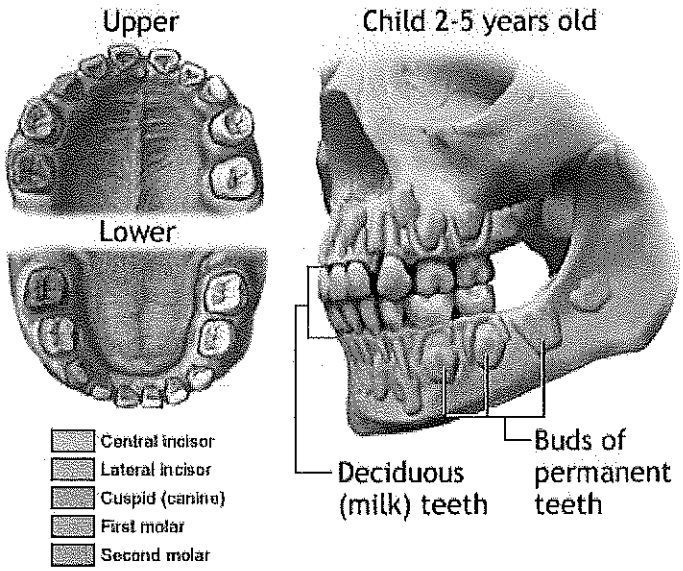
Bring in a 4 oz. bottle of white glue and we'll make something VERY worthwhile out of it on Friday!

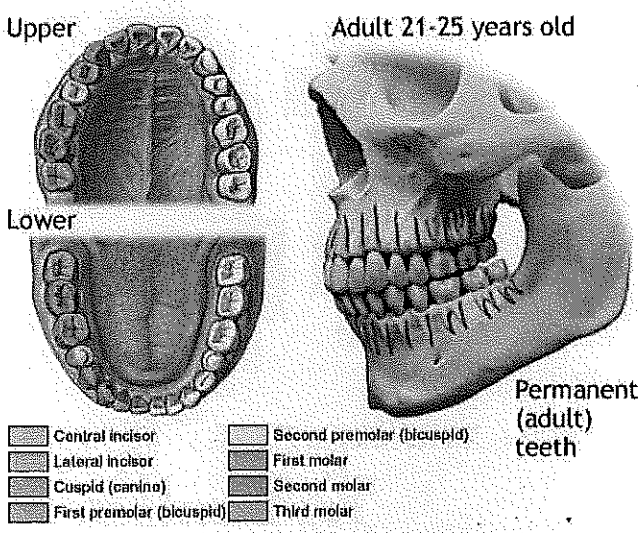
12. How many teeth do children and adults have?

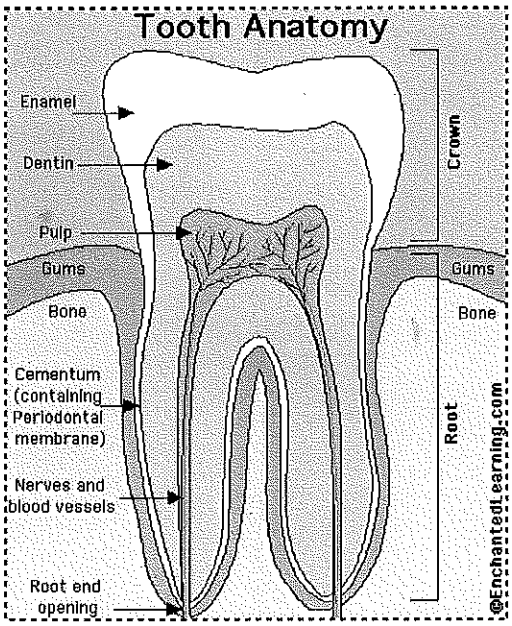
VI. Accessory Organs

A. Teeth

1. Mechanical digestion
2. Two sets in lifetime
   a. Deciduous
      - 6 mo – 12 yrs old
      - 20 total
      - Last 6-12 years
   b. Permanent
      - 32 total



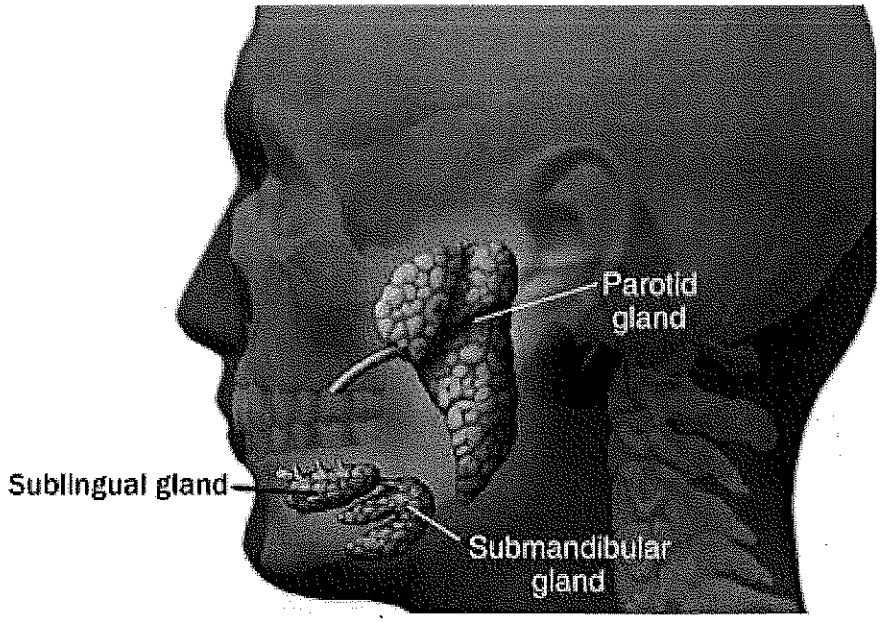




11. Describe the structure and function(s) of the accessory organs.

* Teeth
* Liver
* Gall Bladder
* Spleen
* Pancreas
* Salivary Glands

A. Salivary Glands
   1. Saliva sticks chewed food into a bolus
   2. Starts to digest carbohydrates
   3. Three sets of glands:
      a. Parotid – side of face anterior to ears
      b. Submandibular } *empty saliva into*
      c. Sublingual } *floor of mouth*



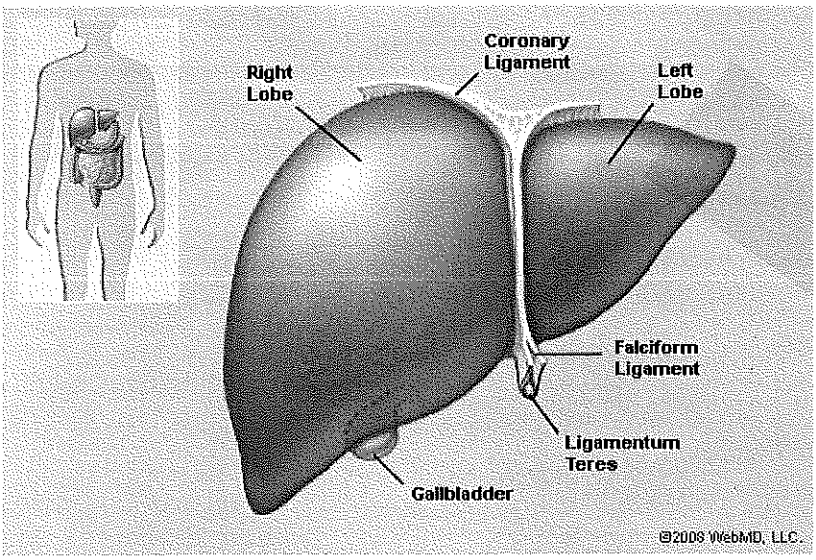
14. Describe what each of the enzymes and hormones of the stomach and small intestine do (~~gastrin~~, HCl, pepsin, rennin, ~~brush border enzymes~~, pancreatic juice, ~~secretin~~, ~~cholecystokinin~~)

HCl, pepsin, rennin

Find under the "Stomach" section (5c)

B. Liver

1. Largest gland in body
2. Makes *bile* – yellow/green fluid that emulsifies fats.



Just breaks fats down, does not digest them

13. How do the liver and gall bladder work together?

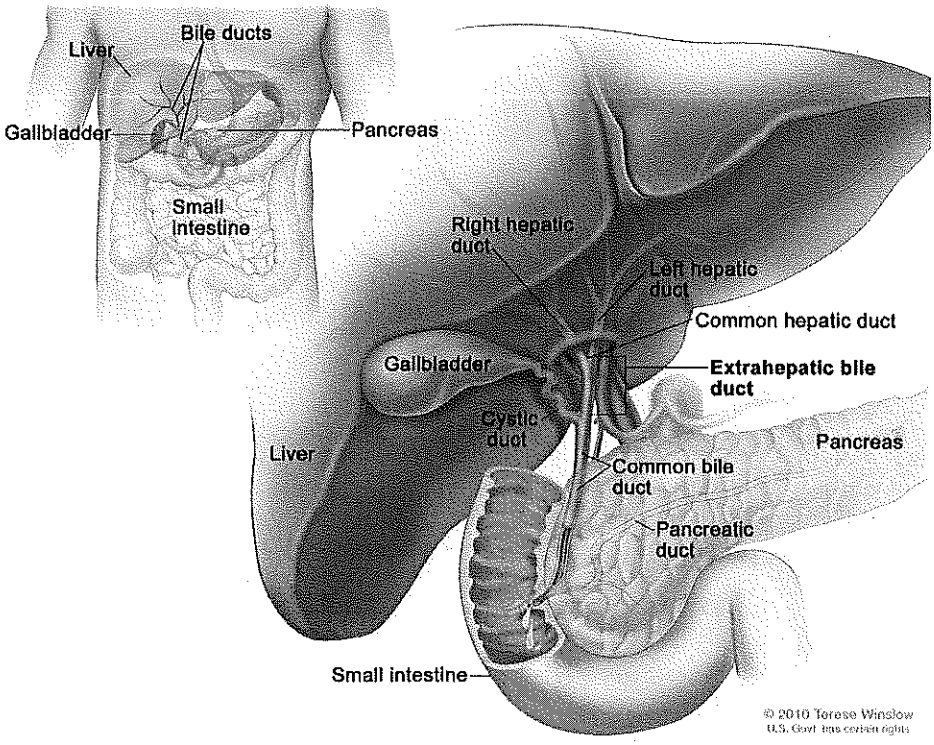
makes bile (emulsifies fats)

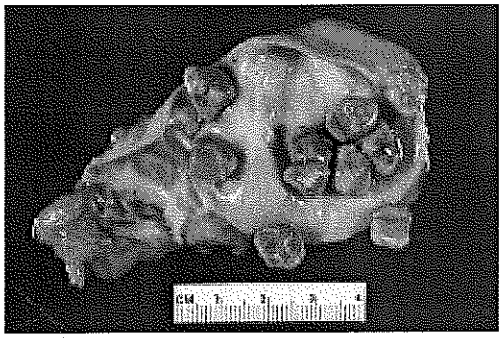
stores and concentrates bile

3. Common Disorders: Jaundice, Hepatitis

C. Gall Bladder

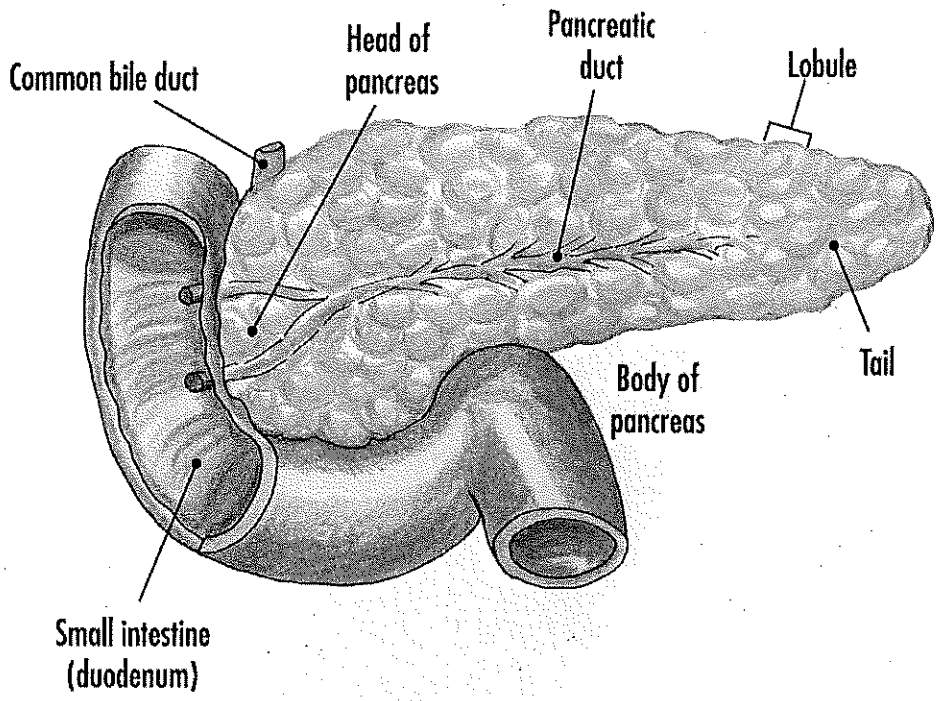
1. Small sac under liver
2. Stores liver's bile when not needed
3. If stored too long, bile may crystallize to form "stones"





D. Pancreas

1. Gland that produces hormones such as *insulin*.
2. Also produces enzymes called *pancreatic juice* that:
   a. Empty into duodenum on small intestine
   b. Digests almost anything, especially fats
   c. Has basic pH to neutralize stomach acids
3. Common Disorders: Diabetes, Pancreatitis



15. Why is it important for pancreatic juice to be chemically basic?

17. What things beside pancreatic juice does the pancreas produce?

VII. Nutrition

A. Nutrient – substance in food used for **growth**, **maintenance**, **repair of body**.

B. Six types of nutrients:

1. **Carbohydrates**
   a. almost all from **plants**
   b. "**sugars**" for **quick energy**
   c. Common chemical formula: $C_6H_{12}O_6$
   d. About **4 calories** per gram

2. **Lipids** (aka: "**fats**")
   a. Energy storage & hormones
   b. About **9 calories** per gram.

3. **Proteins**
   a. supply **amino acids** for **body growth & maintenance**
   b. **longer-lasting** energy source
   c. About **4 calories** per gram.

4. **Vitamins**
   a. **organic** nutrients needed in small amounts as **coenzymes** (**catalysts** for reactions in body)

5. **Minerals**
   a. **inorganic** materials used as **catalysts** for body rxns.
   b. 7 of them: **Ca, P, K, S, Na, Cl, Mg**

6. **Water**
   a. **60%** of the volume of food
   b. only survive **3 days** without it

18. What is the difference between a vitamin and a mineral?

19. What do vitamins do for your body?

VIII. Metabolism

A. The total of all the **chemical rxns** happening in your body, most of which **use energy**.

B. Food energy measured in **kilocalories**: the amount of energy it takes to **raise 1 gram of water by 1 degree Celcius**.

C. Basal Metabolic Rate (BMR)

1. the **minimum number of calories** needed to keep a resting individual **alive for 24 hours**.
2. things that can change your BMR:

-**Age** (_____ BMR as you get older)
-**Height** (tall people have _____ BMR)
-**Pregnancy** (_____ BMR)
-**Stress** (_____ BMR)
- **Ambient Temperature** (hot & cold _____ BMR)
-**Starvation** (_____ BMR)
-**Body Fitness** (lean muscle _____ BMR,
fat tissue _____ BMR)

D. Formulas for calculating BMR:

Males=66+(13.7(weight/2.2))+(5(height in inches*2.54))-(6.8*age)

F Females=655+(9.6(weight/2.2))+(1.7(height in inches*2.54))-(4.7*age)

Example: Joe weighs 150 pounds, is 5'6" tall, and is 21 years old.

BMR=66+(13.7(150pounds/2.2))+(5(66inches*2.54))-(6.8*21years)

=66+(13.7(68.18))+(5(167.64))-(142.8)

=66+934.066+838.2-142.8

=1695.5 calories per day

BMI Calculator: http://apps.nccd.cdc.gov/dnpabmi/

Assn: BMR Calculation Worksheet

I. Overview of the Cardiovascular System

What is the main function of this system?

A. Major function: transportation

1. O_2, nutrients, wastes, hormones, etc.
2. Uses blood to carry things

B. Three major components: heart, vessels, blood

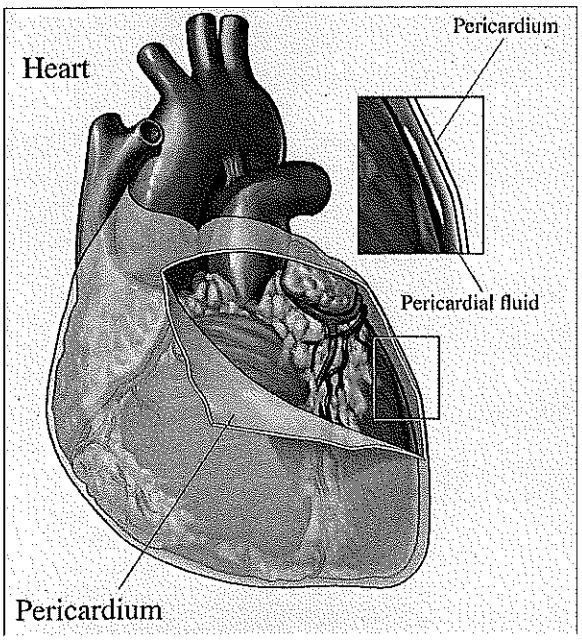
II. Heart

A. One-pound, fist-sized muscular pump with one-way valves.

B. Pumps about 4,000 gallons of blood daily.

C. Inferior (pointy) end called the "apex"; superior (blunt) end called the "base".

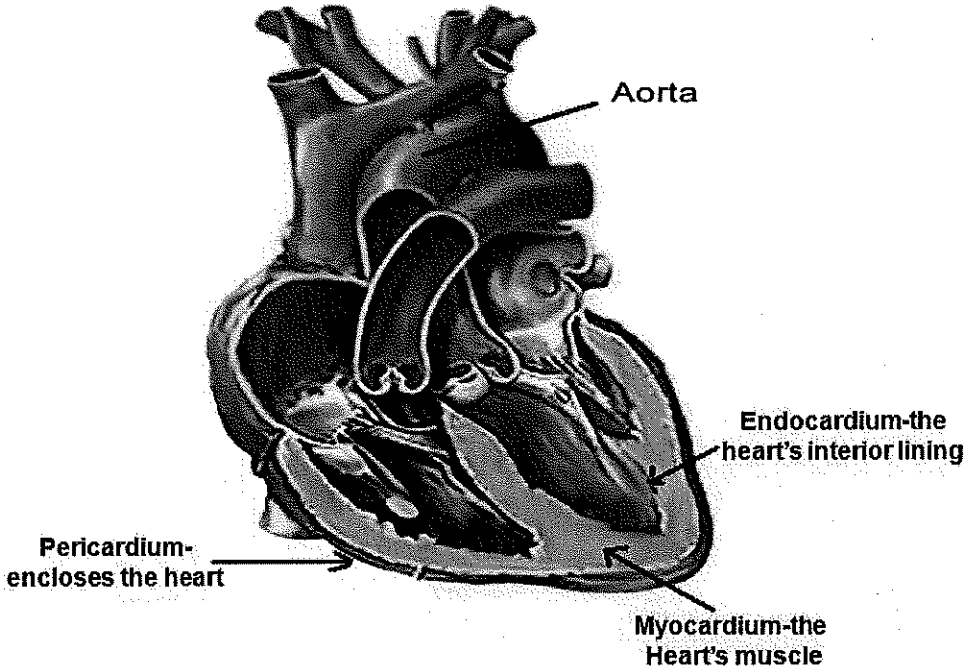
D. Covered with two layers of pericardium with fluid in between (lubrication).



- Describe the 3 layers that make up the heart

E. Heart walls made of three layers:

1. Epicardium – outside layer
2. Myocardium – middle layer (cardiac muscle)
3. Endocardium – inside lining



F. Four hollow chambers (2 atria & 2 ventricles)

1. Atria – receiving chambers (not muscular)
2. Ventricles – sending chambers (muscular)
3. Right A&V – pulmonary circulation
   a. Receive O_2-poor blood from body.
   b. Sends O_2-poor blood to lungs to get O_2.
4. Left A&V – systemic circulation
   a. Receive O_2-rich blood from lungs.
   b. Sends O_2-rich blood to body.

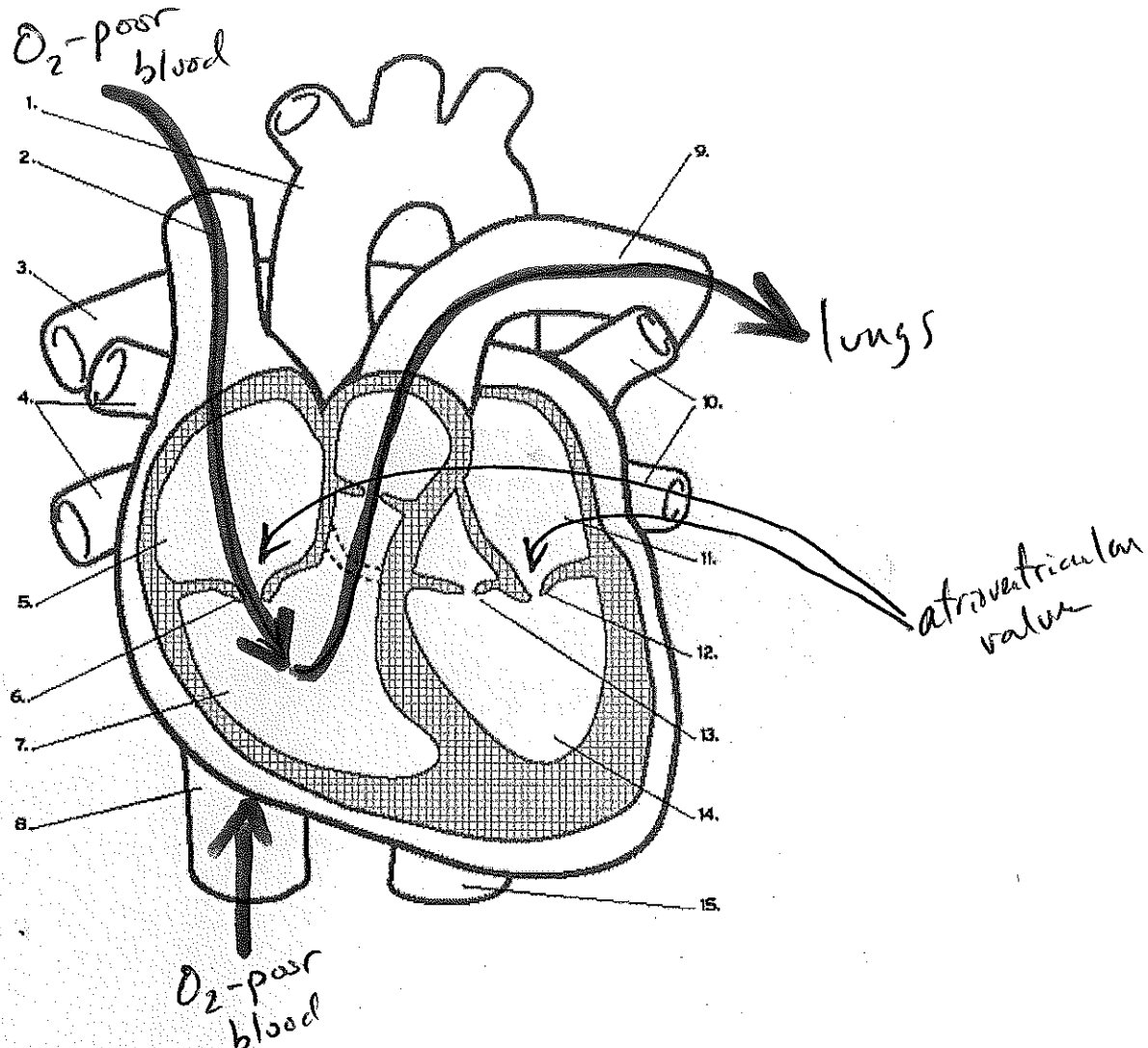
- What structures make up the right side of the heart?

III. Blood Flow through the Heart

A. Pulmonary Circulation (RA → RV → PA → lungs → PV)

- Trace the blood flow through the heart.

- Name describe the 2 main circuits that blood takes through the body.



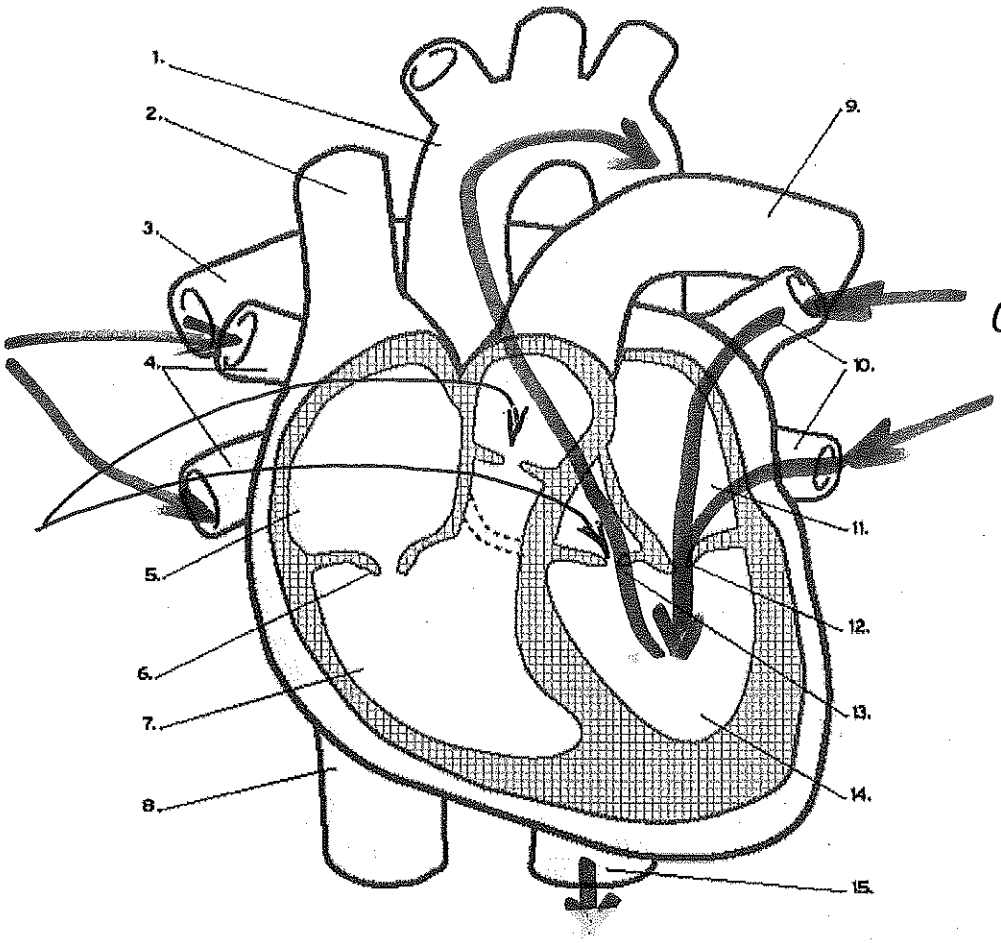
- Where are the atrioventricular valves located? The semilunar valves?

b/w atria and ventricles (tricuspid + bicuspid)

b/w ventricles and outside of heart (aortic and pulmonary semilunar valves)

The left side?

B. Systemic Circulation (LA → LV → aorta → body → VC)



- Why is the left ventricle much thicker than the right ventricle?

(Has to pump blood through entire body, not just to lungs

Assn: p.348-349 Multiple Choice #1,7

Short Answer Essay #1,3,4,5,7

Cardiovascular System Packet #1,2,3,6

IV. Heart Stimulation & Sounds

A. Cardiac muscle can contract on its own without any stimulation, but needs to be synchronized.

B. Two systems control heart activity:

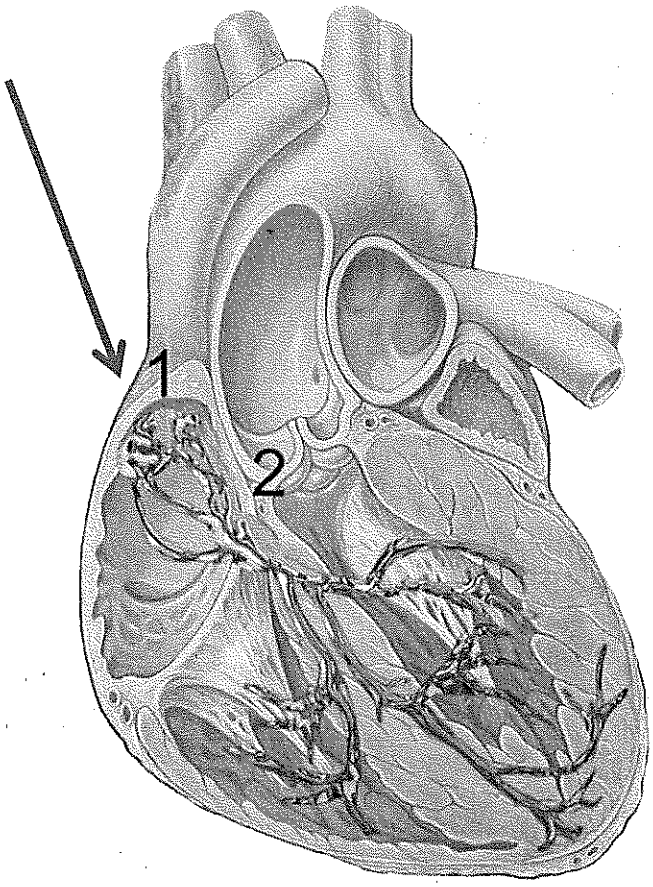
1. Intrinsic Conduction System

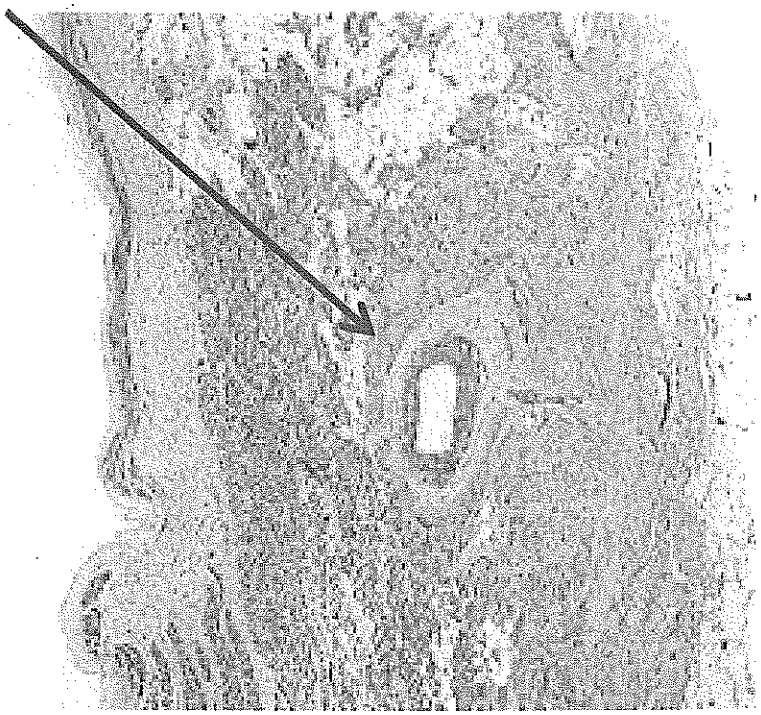
a. Special tissue makes heart contraction in one-way wave (atria → ventricles)

b. Sets pace at 75 bpm

c. Sinoatrial (SA) node

- Creates initial impulse of heartbeat
- Our natural "pacemaker"
- In right atrium of heart





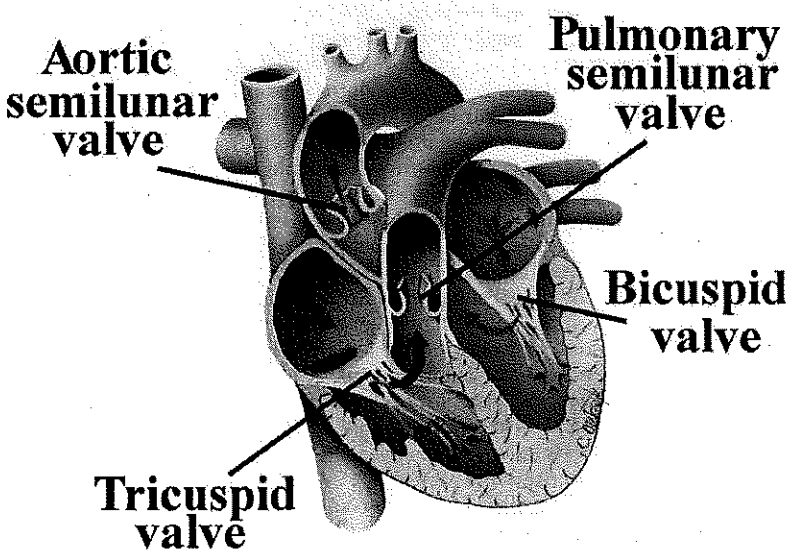
2. Brain Control

*brain acts like brakes / accelerator to modify basic rhythm set by ICS depending on body needs.

- What events produce the "lub" and "dup" sounds during a heart beat?

C. Heart Sounds

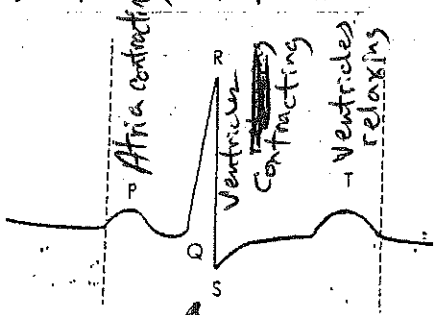
1. Cardiac cycle = one complete heartbeat (~0.8sec)
   a. Contraction of ventricle = systole
   b. Relaxation of ventricle = diastole
2. Beat makes "LUB-DUP" sound from valves closing
   a. "LUB" = closing of tricuspid & bicuspid valves *(from atria to ventricles so quieter)*
   b. "DUP" = closing of aortic & pulmonary semilunar valves. *(from ventricles to lungs or whole body so louder)*



   c. Leaky valves let some blood flow backward, making a gurgling sound called a "heart murmur".

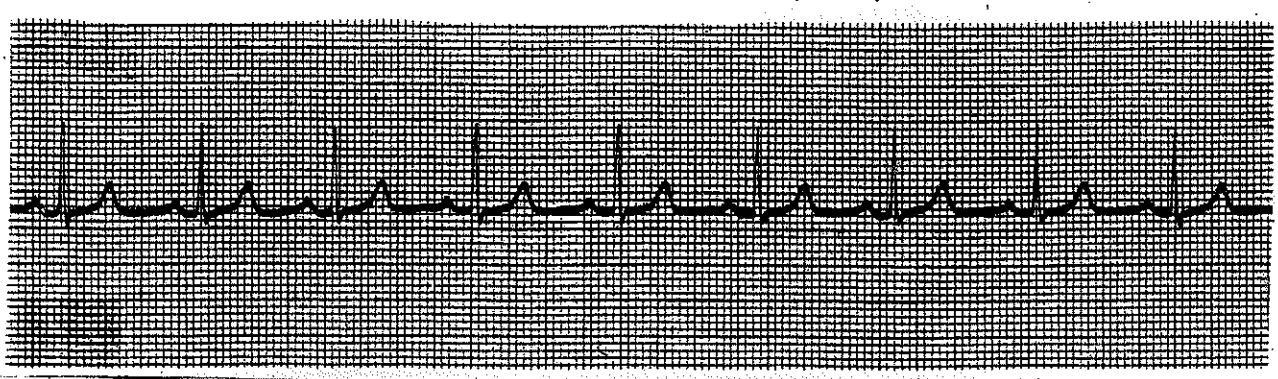
V. Reading Electrocardiogram (ECG) Strips

Each phase of the cardiac cycle produces a specific wave in the ECG complex.

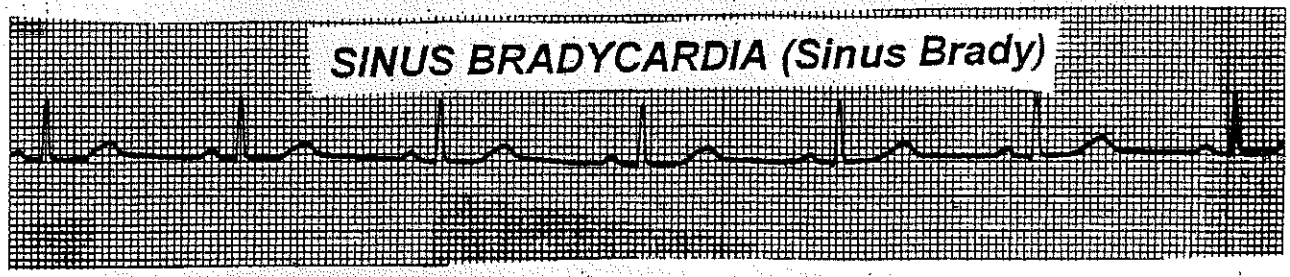


signal of atria relaxing is lost in signal of ventricles contracting

Normal Sinus Rythym



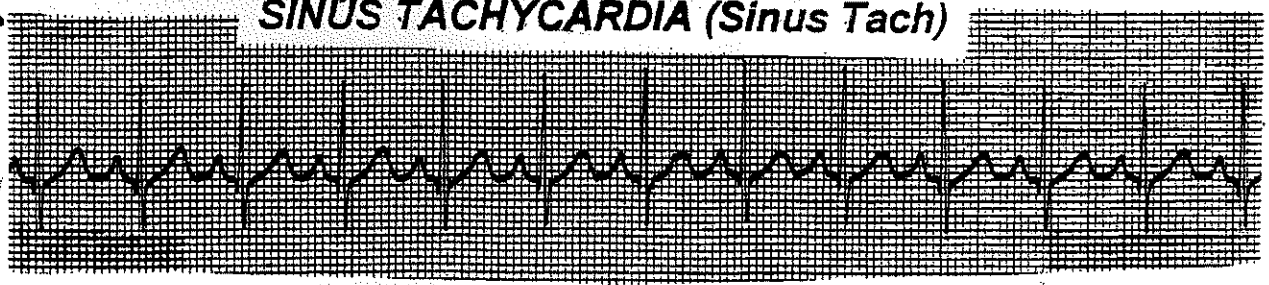
1. **SINUS BRADYCARDIA (Sinus Brady)**



All waves there, but slow!

Too Slow!

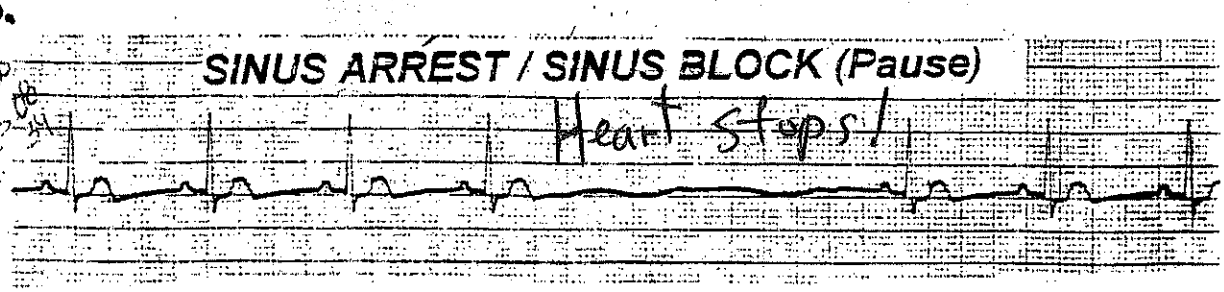
2. **SINUS TACHYCARDIA (Sinus Tach)**



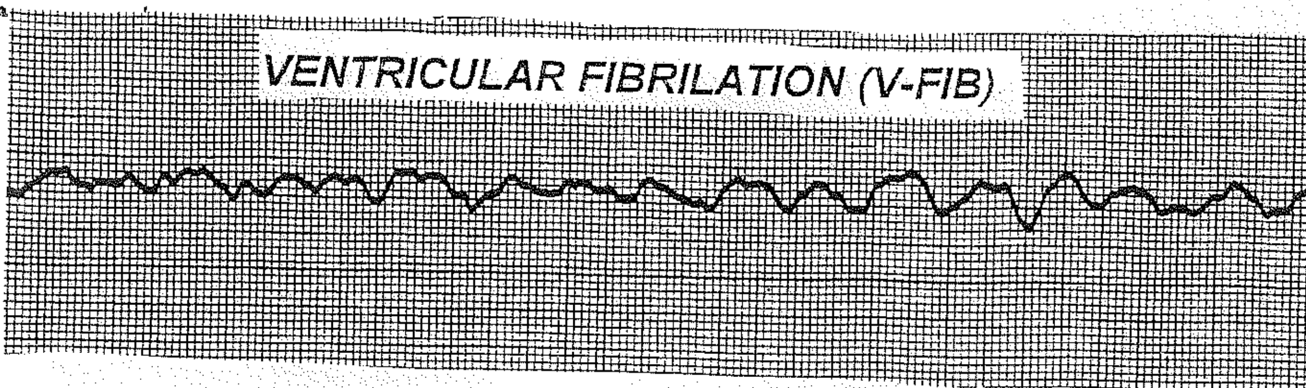
Too Fast!

3. **SINUS ARREST / SINUS BLOCK (Pause)**

Heart Stops!

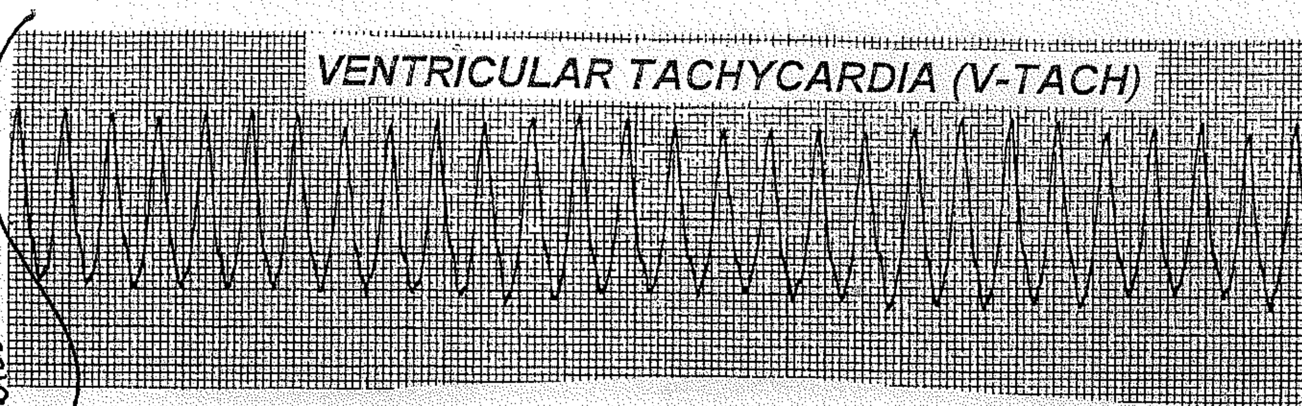


Not pumping blood



No rhythym to ventricle contractions

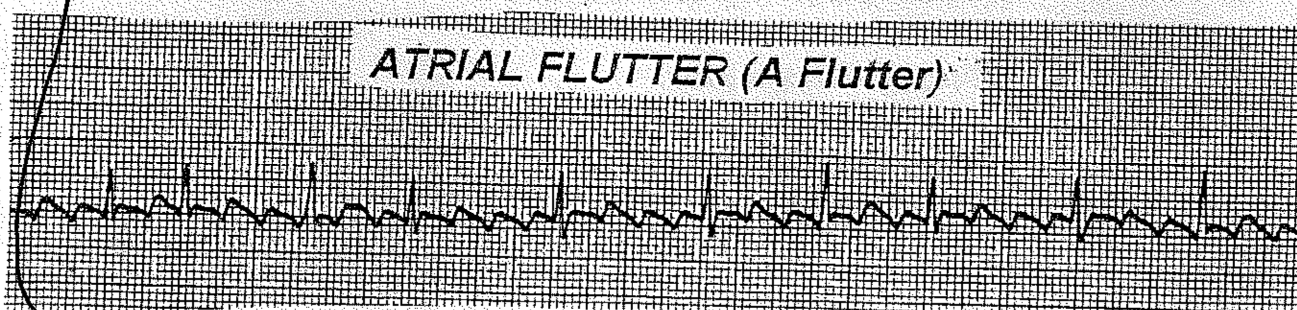
5.



Ventricle contracting too fast!

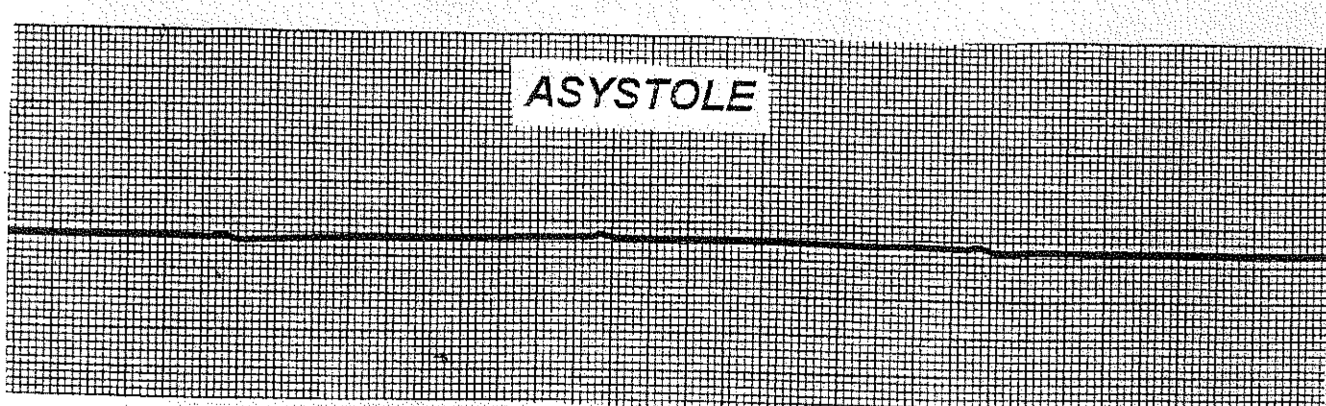
chambers can't refill w/ blood

6.



Atria contracting too fast

7.



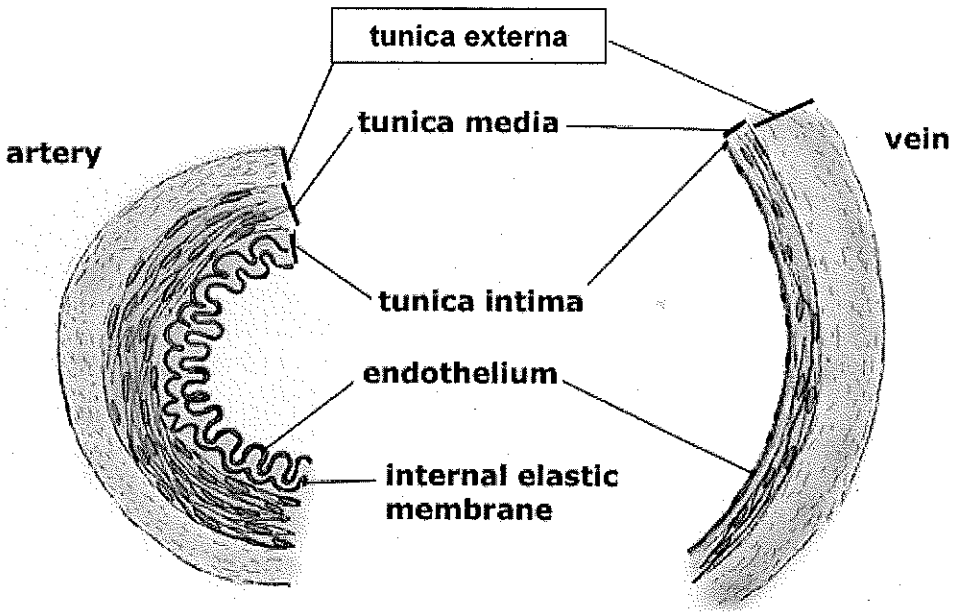
Dead

VI. Blood Vessels

A. Vessel walls made of 3 layers:

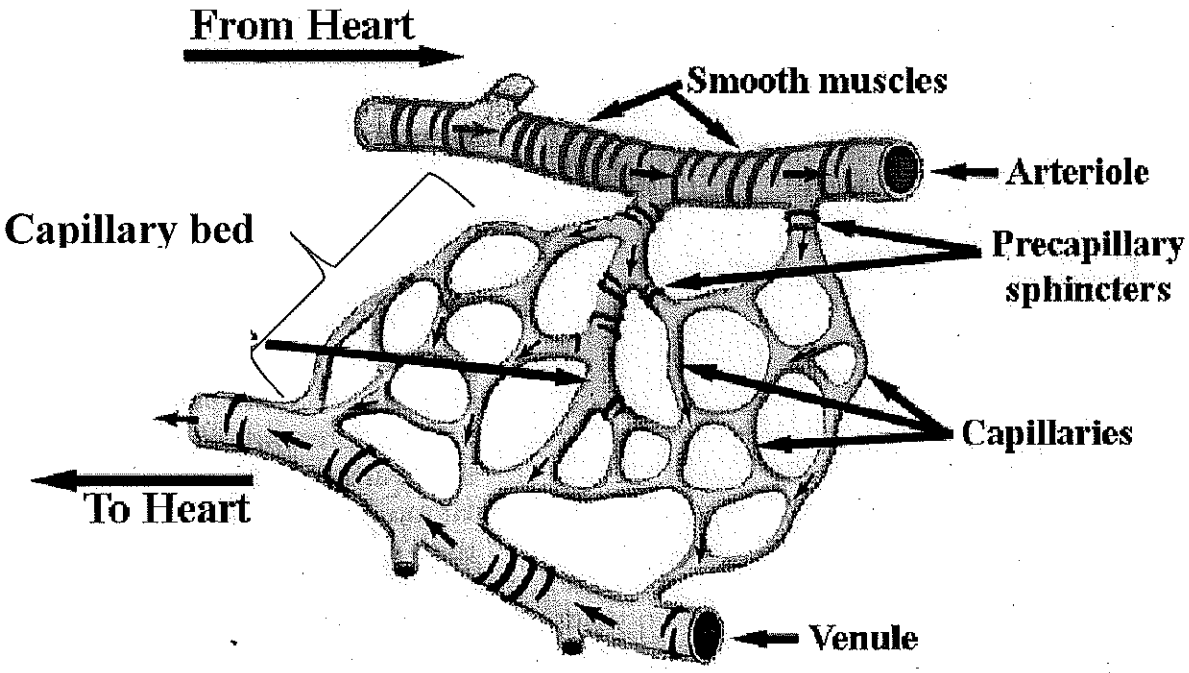
1. Tunica intima – slick inner layer.
2. Tunica media – middle layer of smooth muscle.
3. Tunica externa – outer layer of fibrous connective tissue for protection.

- Describe the 3 layers that make up blood vessels.



B. Arteries - vessels that carry blood ***away*** from heart.
   1. Oxygen-rich blood (except for pulmonary artery).
   2. Arterioles – smaller arteries.
   3. Capillaries – smallest vessels where gas exchange happens between blood and body cells.

C. Veins – vessels that carry blood ***back*** to the heart.
   1. Oxygen-poor blood (except for pulmonary vein).
   2. Venules – small veins that drain capillaries.



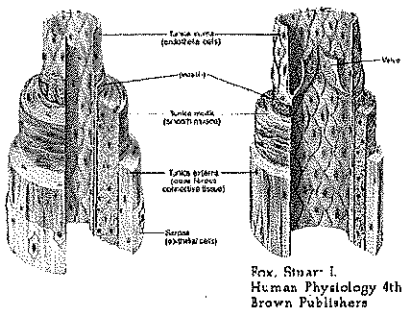
- What are the differences between veins and arteries?

D. Differences between arteries and veins:

1. Arterial blood is under more pressure than venous blood.
   *Arteries spurt, veins ooze.
2. The walls of arteries are thicker than the walls of veins.
3. Veins have valves that prevent backflow.
   *less pressure because farther from heart0
   *against gravity
   *common site of blood clots
4. "Arteries pump, veins dump"

- Why do veins have valves and arteries don't?

artery vein



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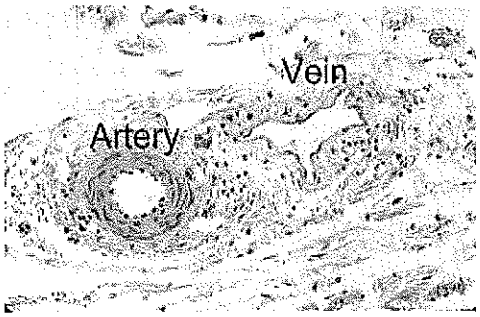
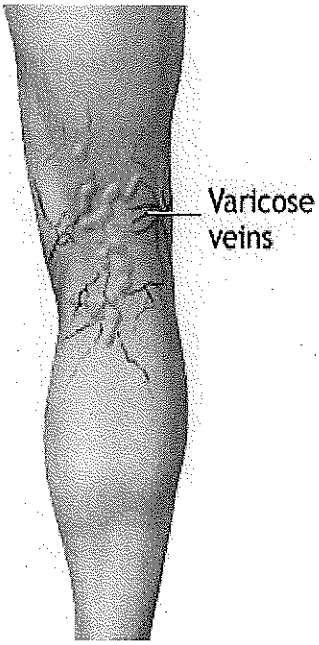
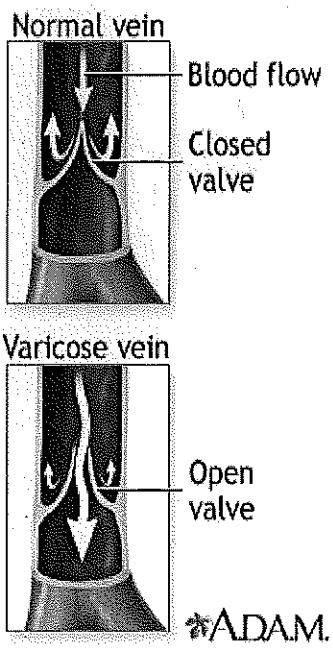






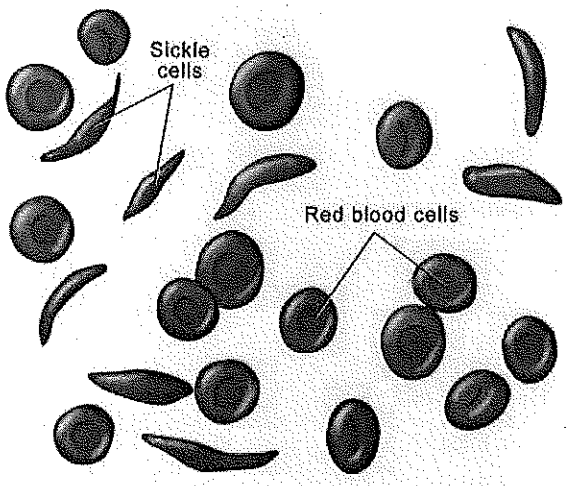
- Is blood pressure higher in veins or arteries? Why?

- Describe each of these cardiovascular disorders:
  Myocardial Infarction, Congestive Heart Failure, Aneursym, Sinus Bradycardia, Sinus Tachycardia, Ventricular Fibrillation, Ventricular Tachycardia, Sinus Arrest/Block, Atrial Flutter, Asystole

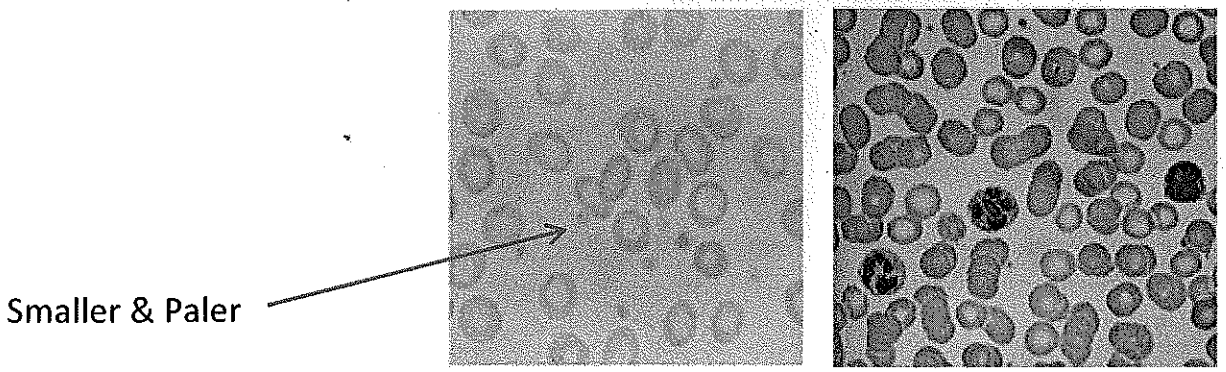
VIII. Cardiovascular System Disorders

A. Anemia – blood does not carry enough oxygen.

1. Sickle Cell Anemia – misshaped RBC's



2. Iron Deficient Anemia – not enough Fe to carry O_2

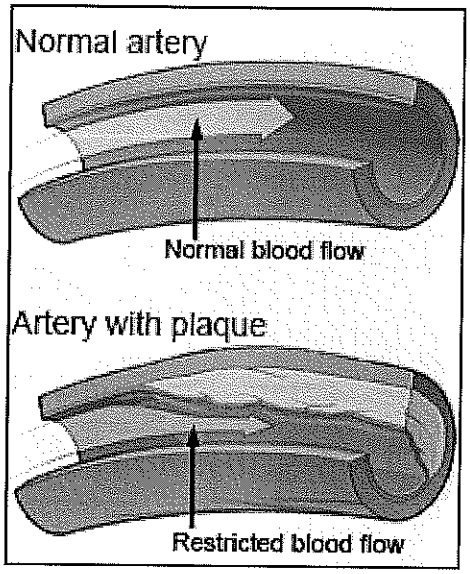


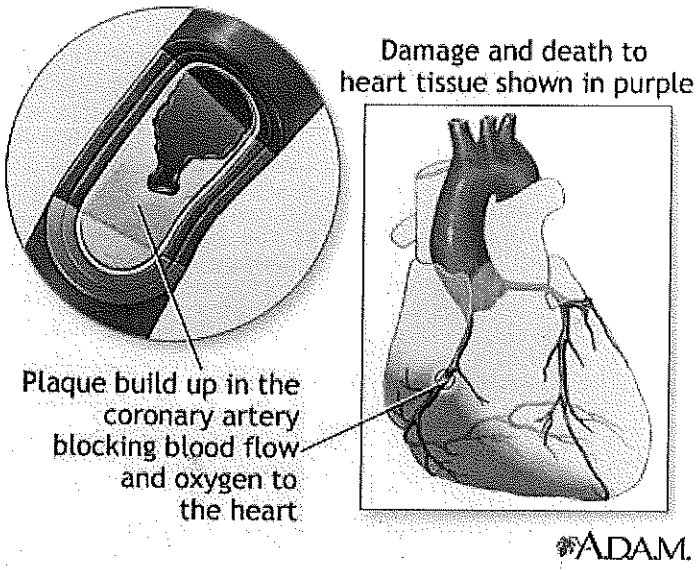
anemia

normal blood

B. Arteriosclerosis

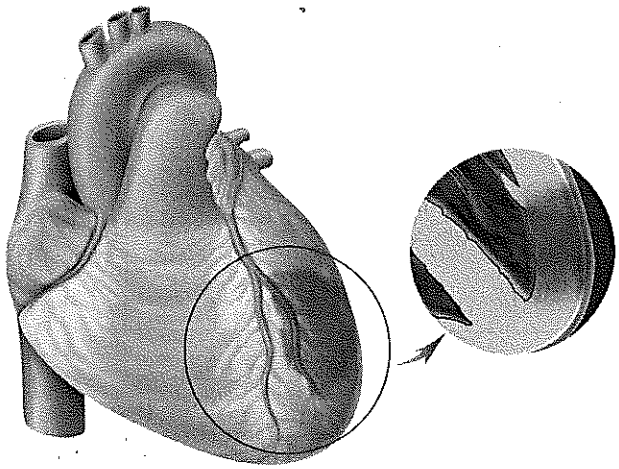
1. Thickening and toughening of artery wall.
2. Usually caused by build-up of fats (called "plaque") from high blood cholesterol levels.
3. Reduced blood supply can result in heart attack.

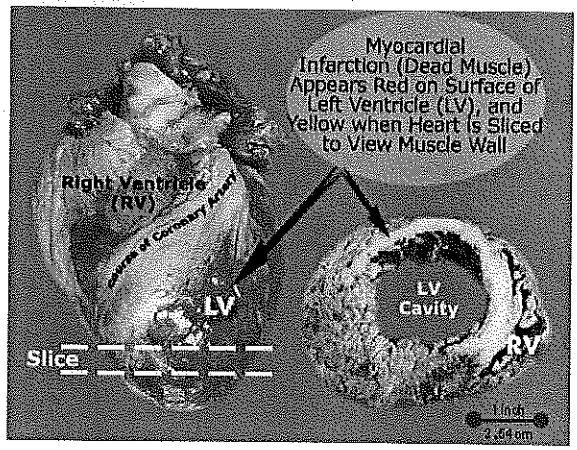




C. Heart Attack (<u>myocardial infarction</u>)

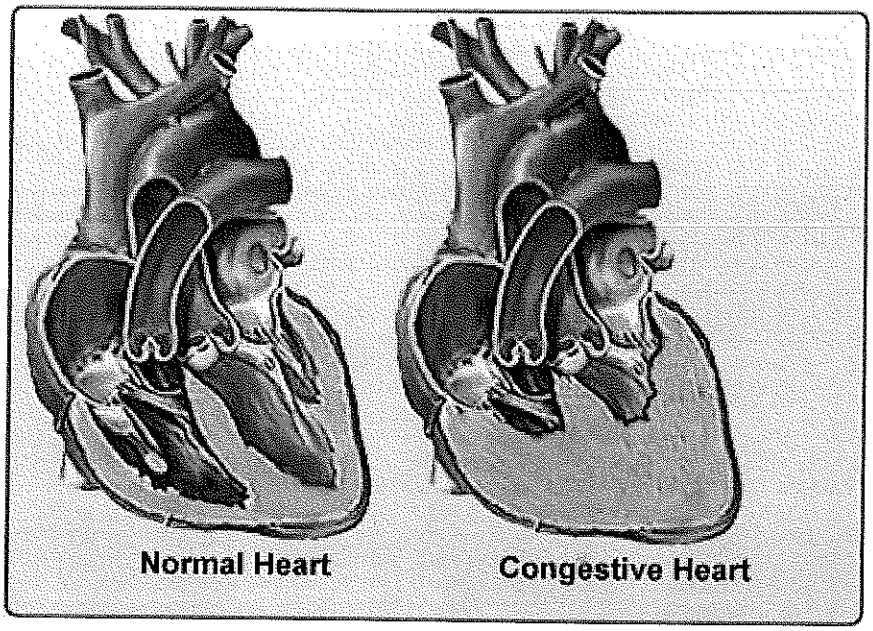
1. Blood supply to heart is blocked.
2. Cardiac muscle cells that die off are not replaced.





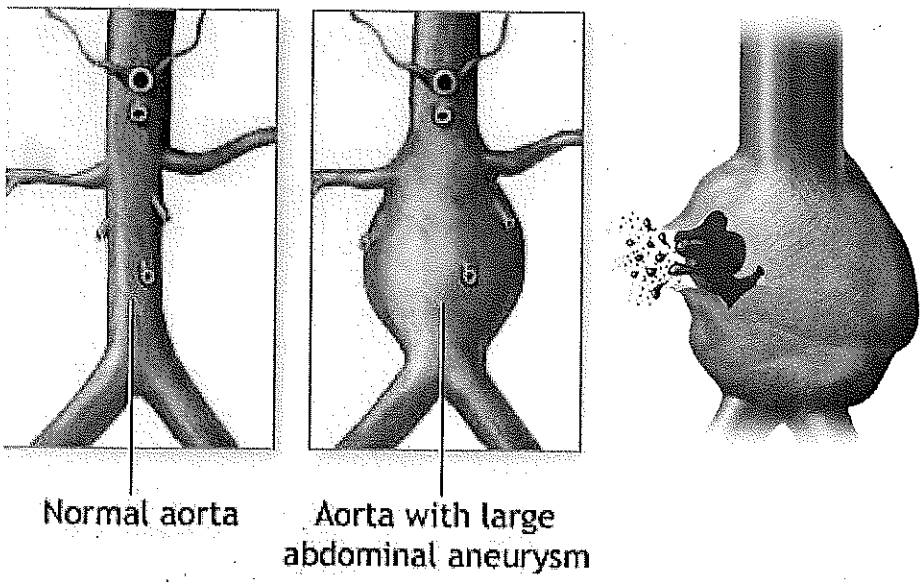
D. Congestive Heart Failure

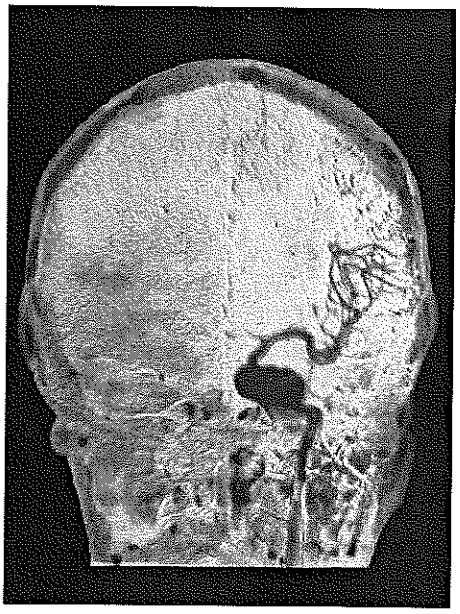
1. Heart is too weak to deliver adequate blood to body.
2. Infections, toxins, high BP can weaken heart.



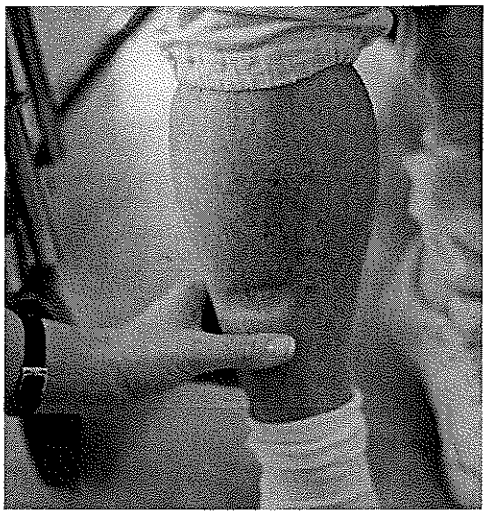
E. Aneurysm

1. Bulge in blood vessel.
2. No symptoms until burst, then catastrophic.





F. Edema – blocked lymph vessels



IX. Vital Signs – measurements of health including
- Respiratory Rate
- Body Temperature
- Arterial Pulse } *cardio*
- Blood Pressure } *functions*

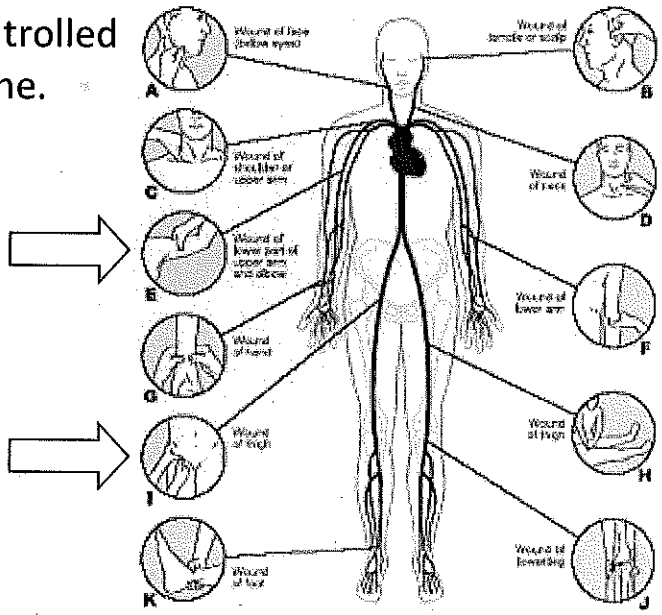
A. Arterial Pulse

1. Expansion of arterial wall during systole.

newborn (0-3 months old)	infants (3 — 6 months)	infants (6 — 12 months)	children (1 — 10 years)	children over 10 years & adults, including seniors	well-trained adult athletes
100-150	90–120	80-120	70–130	60–100	40–60

2. Also function as <u>pressure points.</u>

Where blood flow can be controlled by pressing artery against bone.



B. Blood Pressure

1. Exerted against arterial walls.
2. Includes two measurements
   a. Systolic Pressure
      - When ventricles are contracted
      - Higher pressure (~120mmHg)

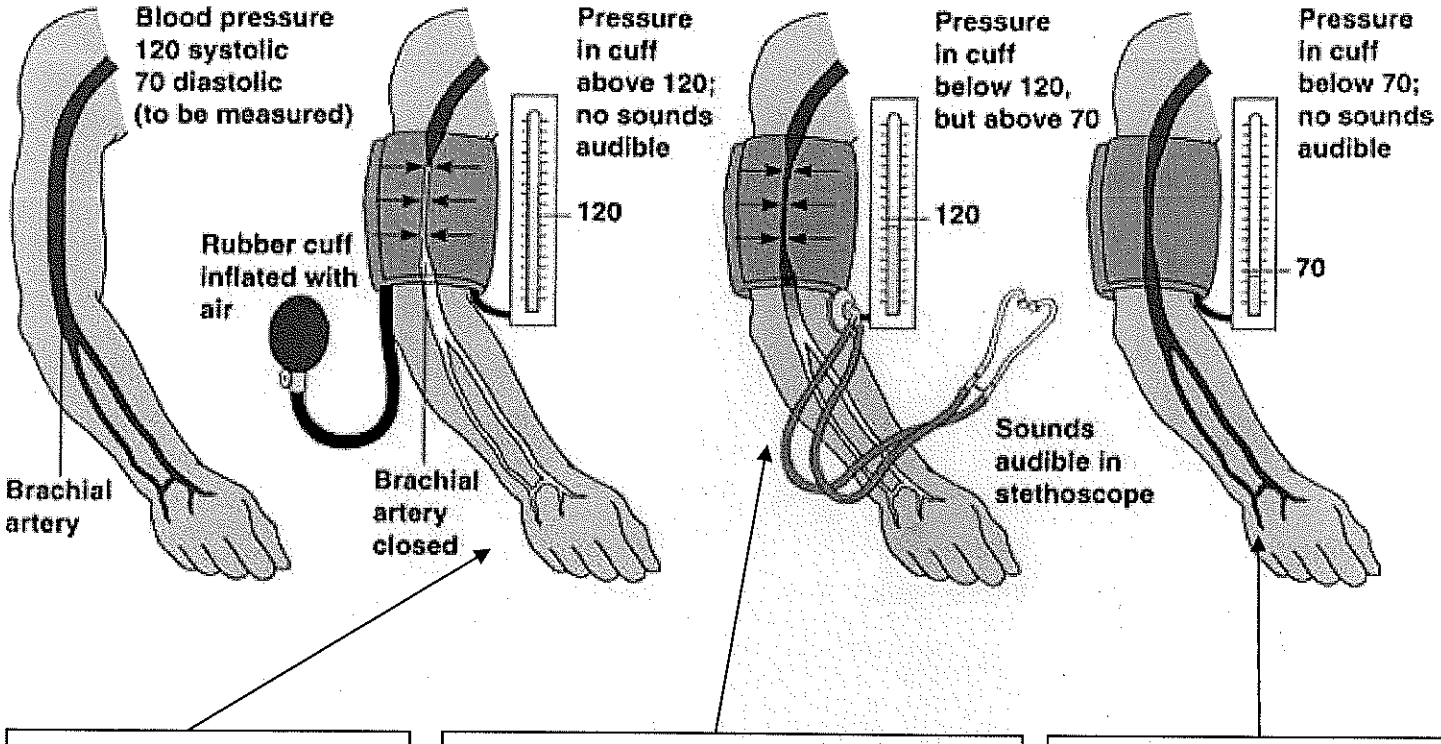
   b. Diastolic Pressure
      - When ventricles are relaxed

written as sys/dia

(ex: 120/80)

- Lower pressure (~80mmHg)

3. Measuring Blood Pressure

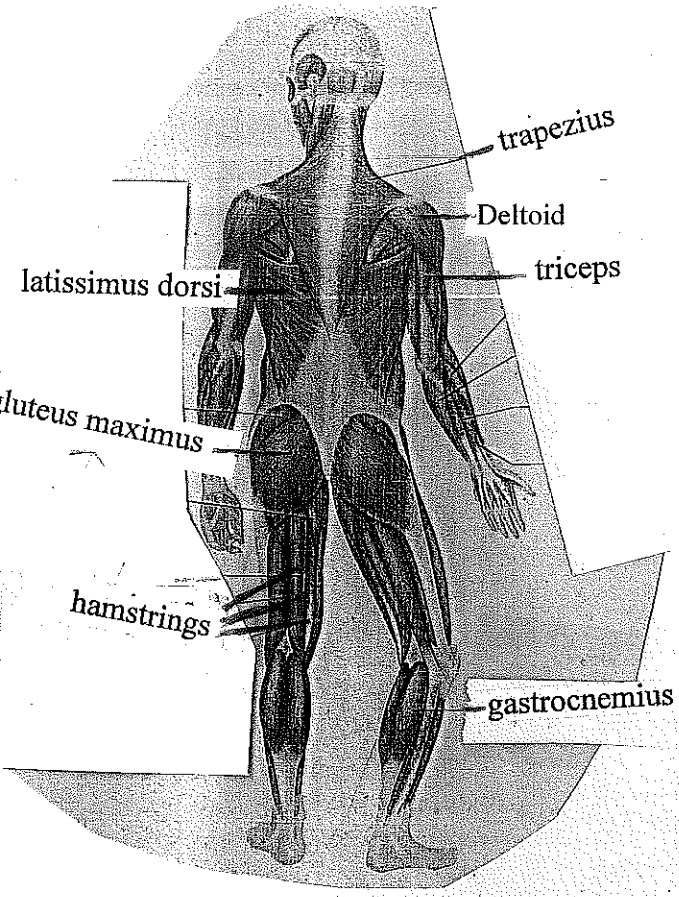


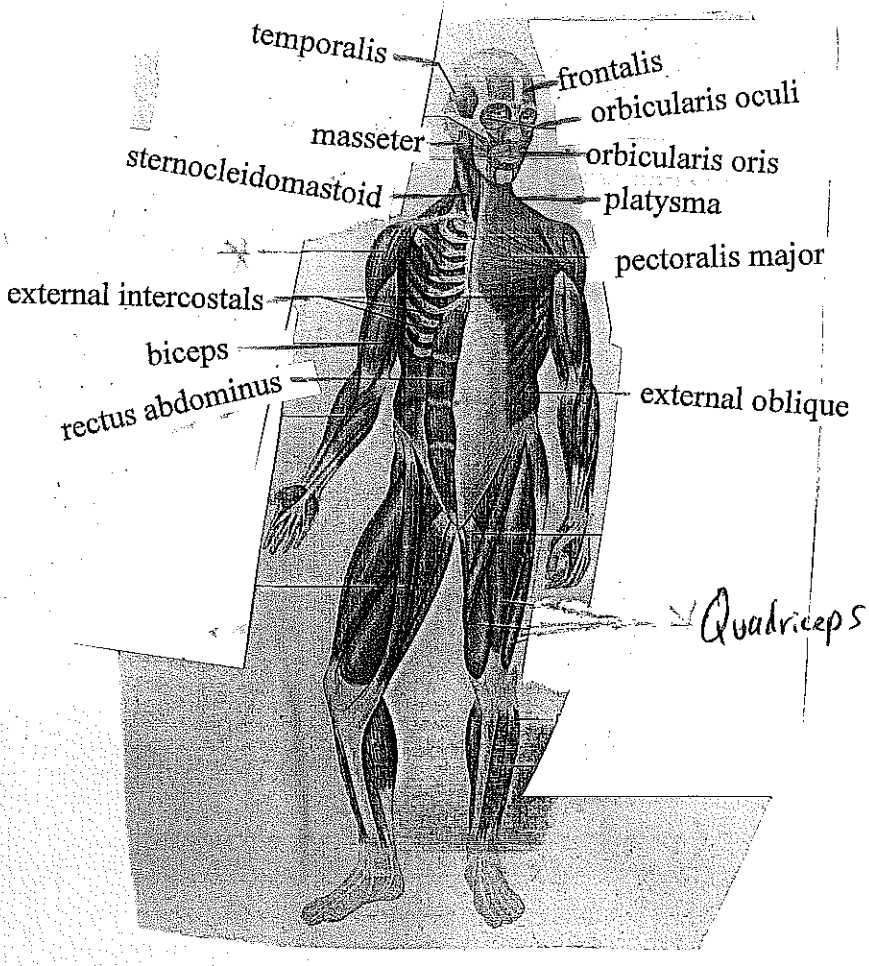
Inflate cuff until no pulse is heard below the cuff. This should be above 120mmHg. Artery is now completely pinched closed.

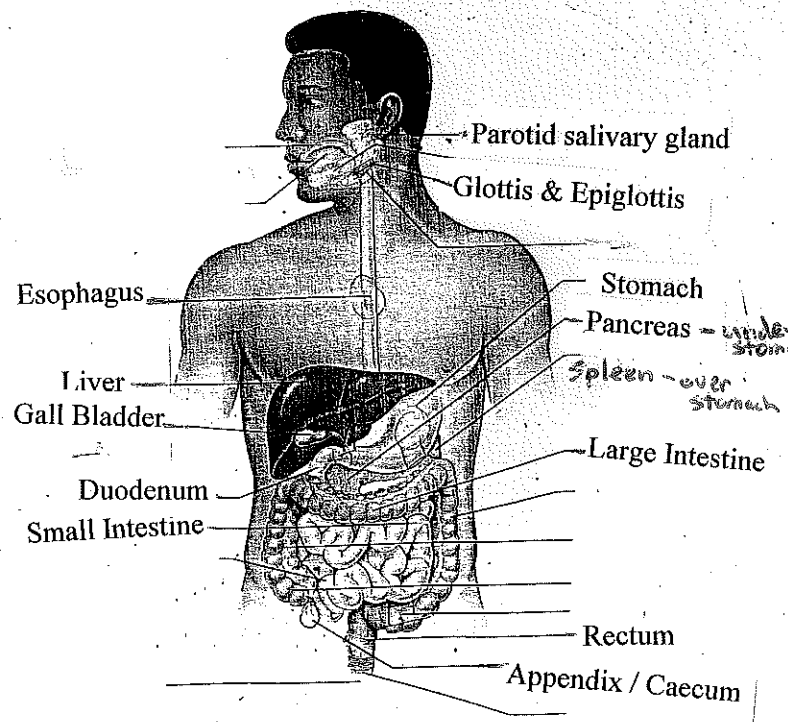
While listening for a pulse, slowly release the air from the cuff until a pulse is heard. This is the blood starting to flow through the artery under high pressure. Record this value as the systolic (contracted heart) pressure.

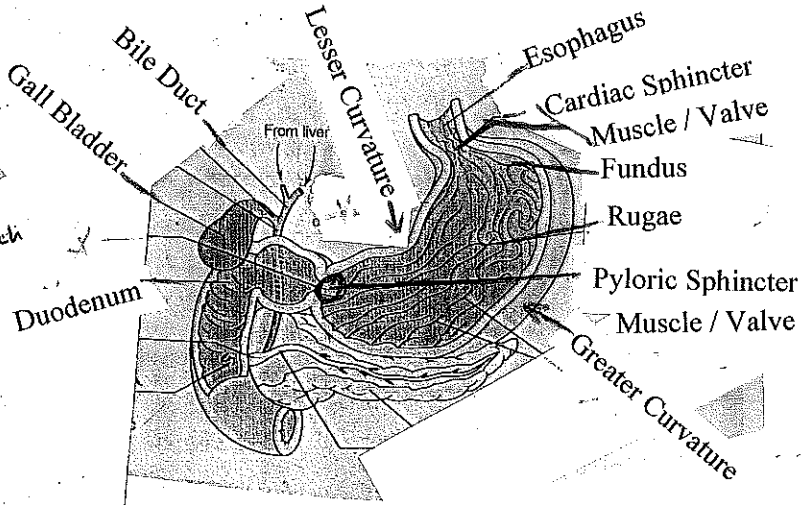
Continue to release pressure from the cuff until no pulse is heard. Record this value. It shows where the diastolic (relaxed heart) pressure begins, which is too low-pressure to be heard.

Be able to identify these structures:
(and on the piggy too, of course!)









Be able to identify these structures: (and on the piggy too, of course!)