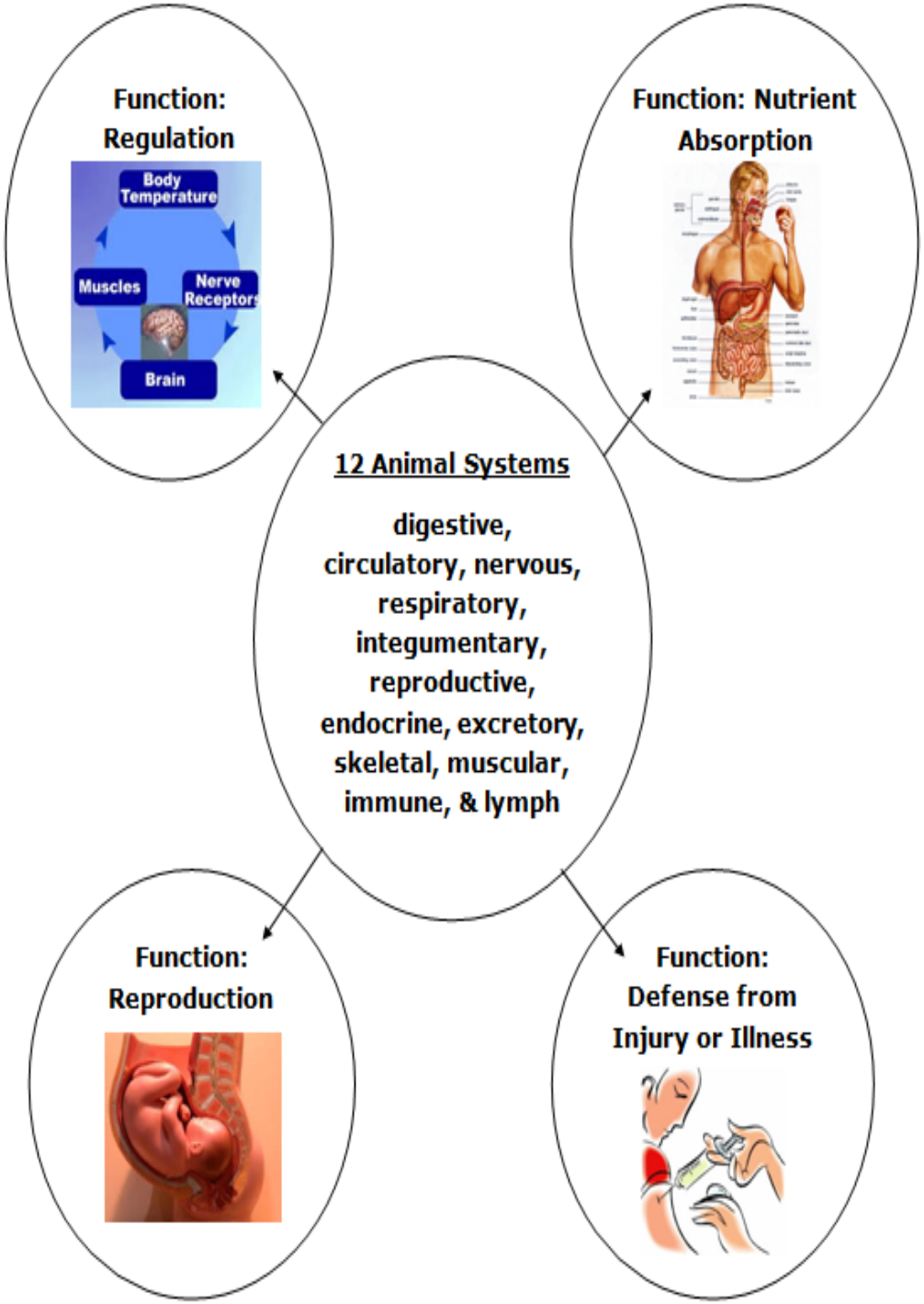
Dec 11th/12th

- On your warm-up page please answer the following:
- List as many of the body systems as you can remember- give the function of at least 3 of them

The Human Body

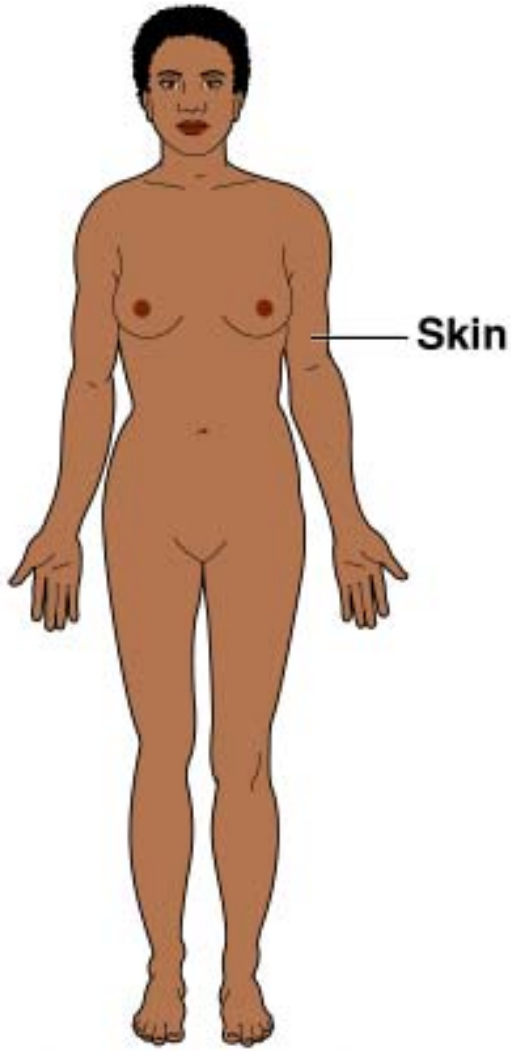


Student Expectation (SE) 10C – analyze the levels of organization *in biological systems* and **relate** the levels *to each other and to the whole system*

Student Expectation (SE) 10A – describe the interactions that occur among systems *that perform the functions of regulation, nutrition absorption, reproduction, and defense from injury or illness in animals.*

Integumentary – aka – YOUR SKIN!

- Forms the external body covering
- Skin, hair, nails and tears keep pathogens OUT
- Protects deeper tissue from injury



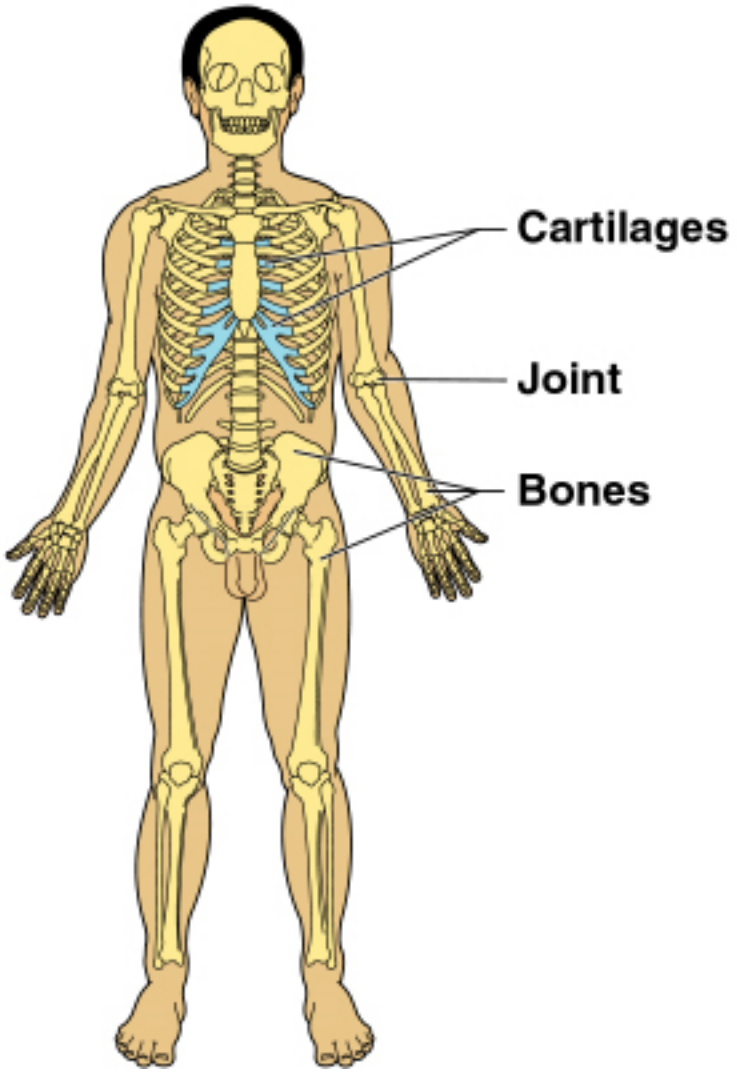
SYSTEM INTERACTIONS

- The Integumentary systems works with:
  - All systems to prevent them from damage!
  - Nervous System – Skin communicates to nerves when pain is felt
  - Reproductive System – skin stretches to accommodate a fetus

Did you know??

- The skin is the largest organ in the human body
- An average adult's skin spans 21 square feet, weighs nine pounds, and contains more than 11 miles of blood vessels.
- The skin releases as much as three gallons of sweat a day in hot weather. The areas that don't sweat are the nail bed, the margins of the lips, and the eardrums.

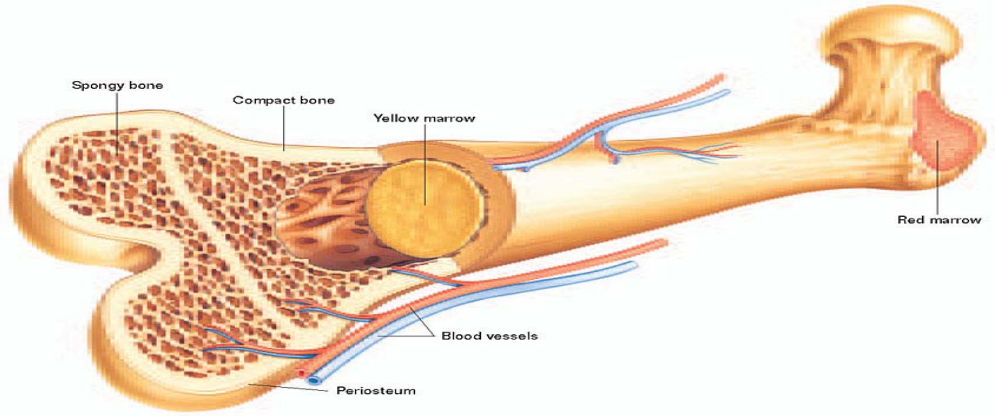
Skeletal System – aka – BONES!



- Protects and supports body organs
- Makes red and white blood cells in the marrow
- Composed of bones, cartilage, ligaments and joints.

SYSTEM INTERACTIONS

- The SKELETAL SYSTEM works with:
  - Muscular System: Muscles moves the bones
  - Circulatory System / Immune System: Bone marrow produces red and white blood cells



  - Respiratory : Rib bones protect the lungs.

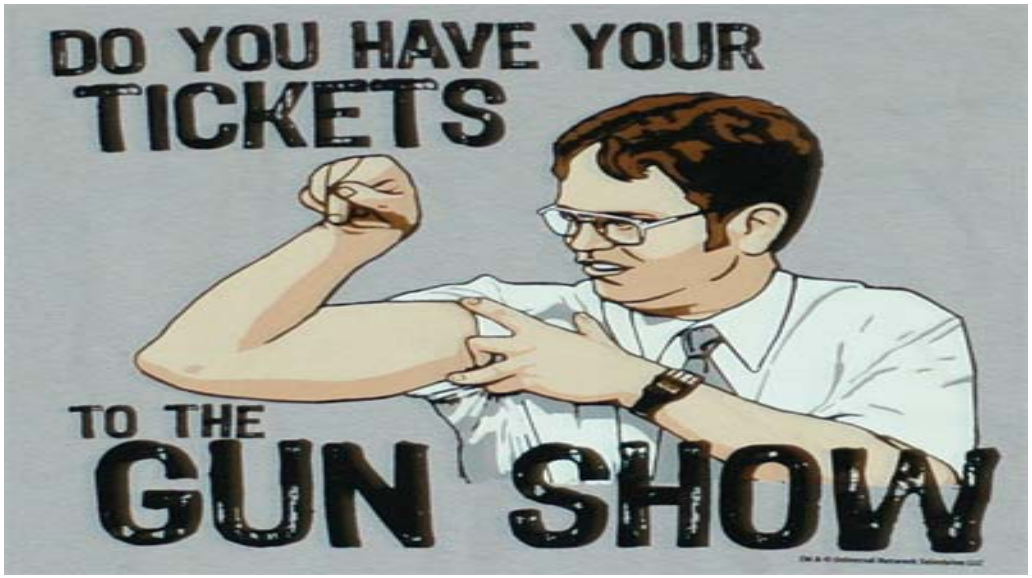
Did you know??

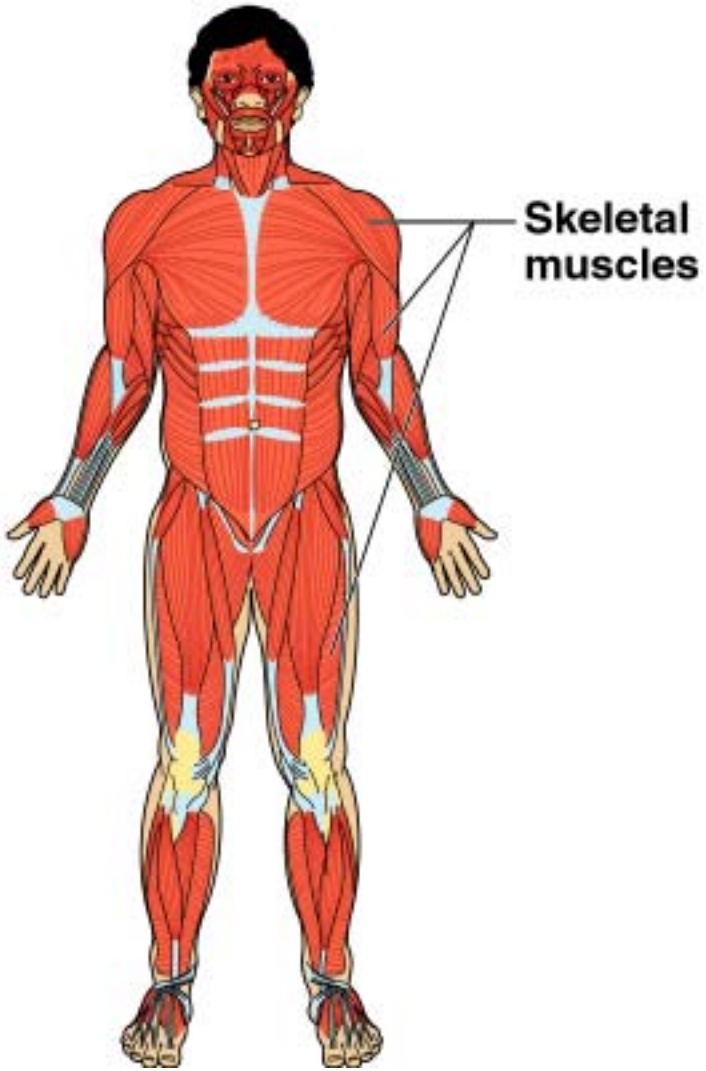
- Our bone is six times stronger than steel if both are of the same weight.
- The size of the smallest bone is equivalent to the size of a rice grain.
- Of the 206 bones in the skeletal system, 52 of them make both our feet.

Muscular System – aka – muscles

Muscular

- Allows locomotion (movement)
- Maintains posture
- Protects internal body organ

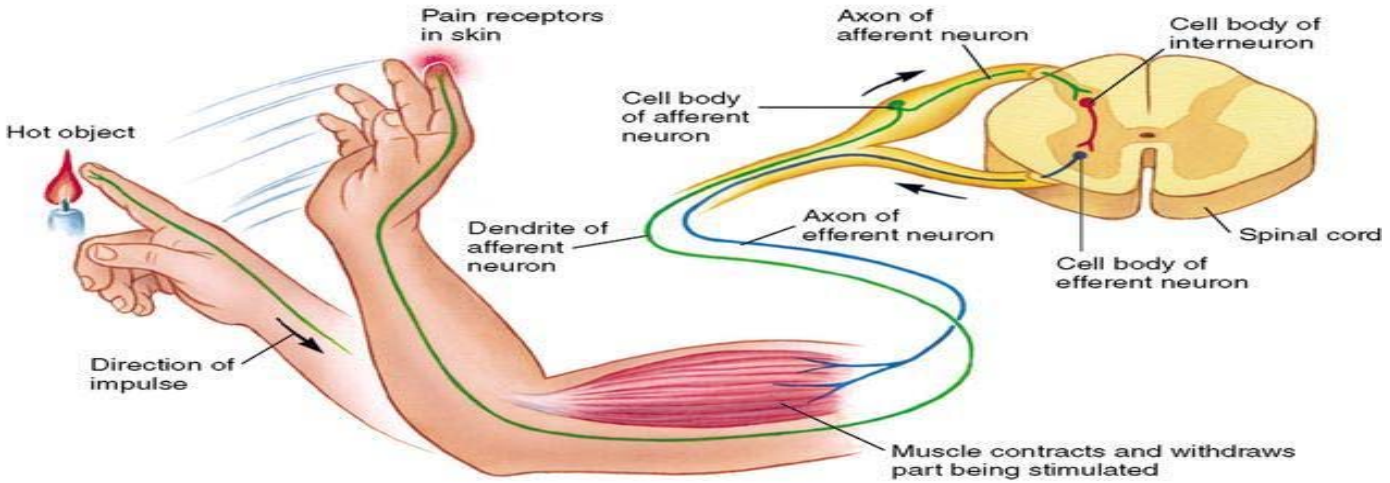




SYSTEM INTERACTIONS:

The MUSCULAR SYSTEM works with:

- Nervous System: Nerves use a reflex arc to move the muscles.

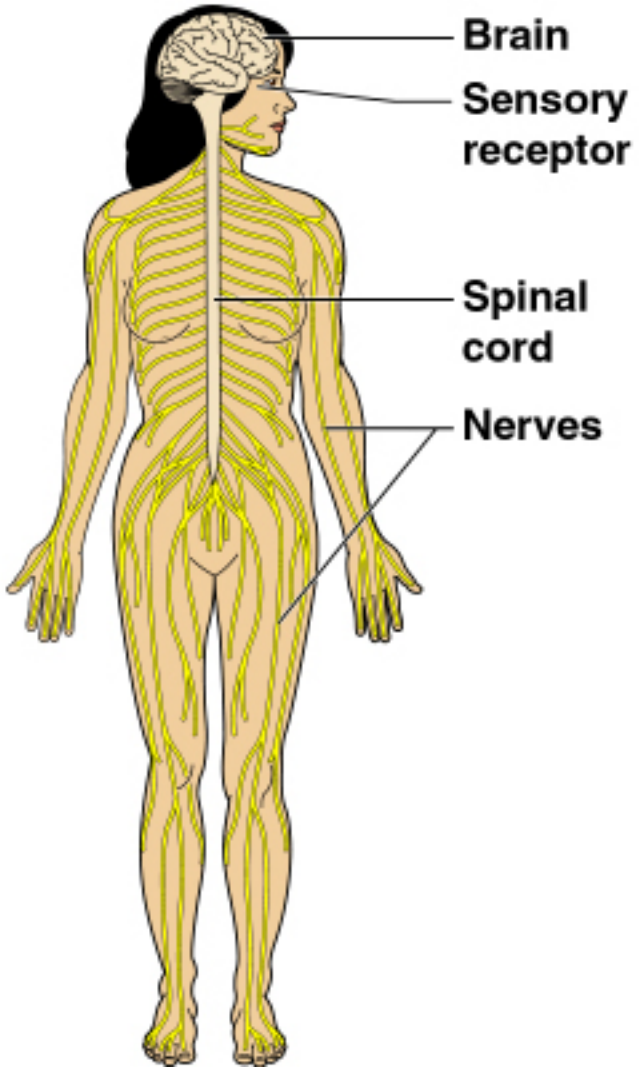


- Digestive System: Muscles move food particles through the body.

Did you know!?

- It takes 17 muscles to smile and 43 to frown.
- The strongest muscle in the human body is the tongue.
- You use 200 muscles to take one step.

Nervous System – aka – NERVES!

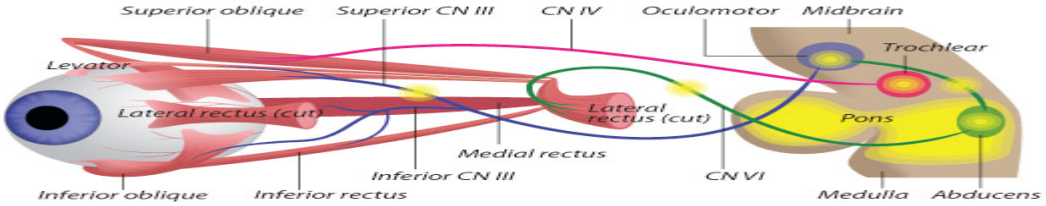


- Responds to internal and external change
- Activates muscles and glands
- Controls all systems along with the endocrine system to maintain homeostasis

SYSTEM INTERACTIONS:

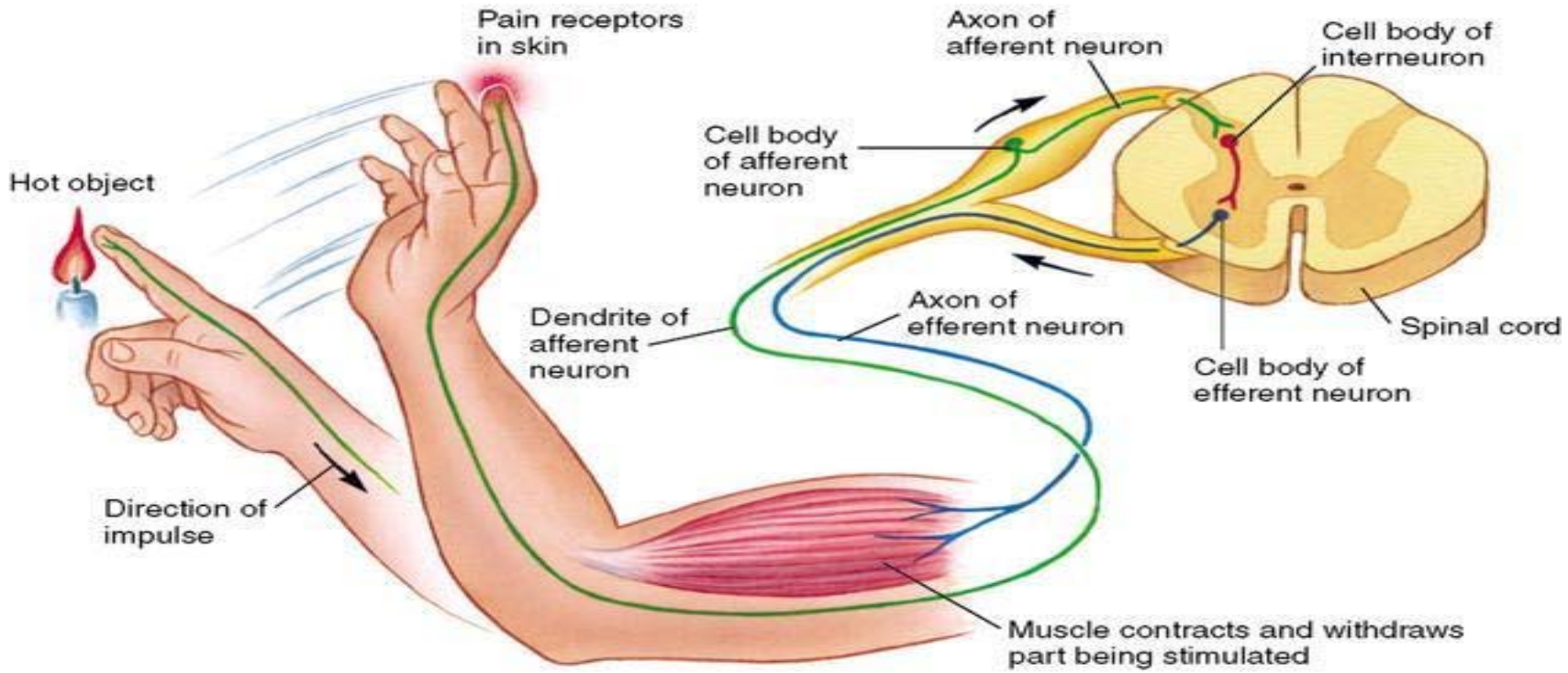
The NERVOUS SYSTEM works with:

- Muscular System: Nerves cause muscles to move through a reflex arc to avoid pain. Also, nerves in the eyes communicate messages to your brain which activate muscles when necessary.



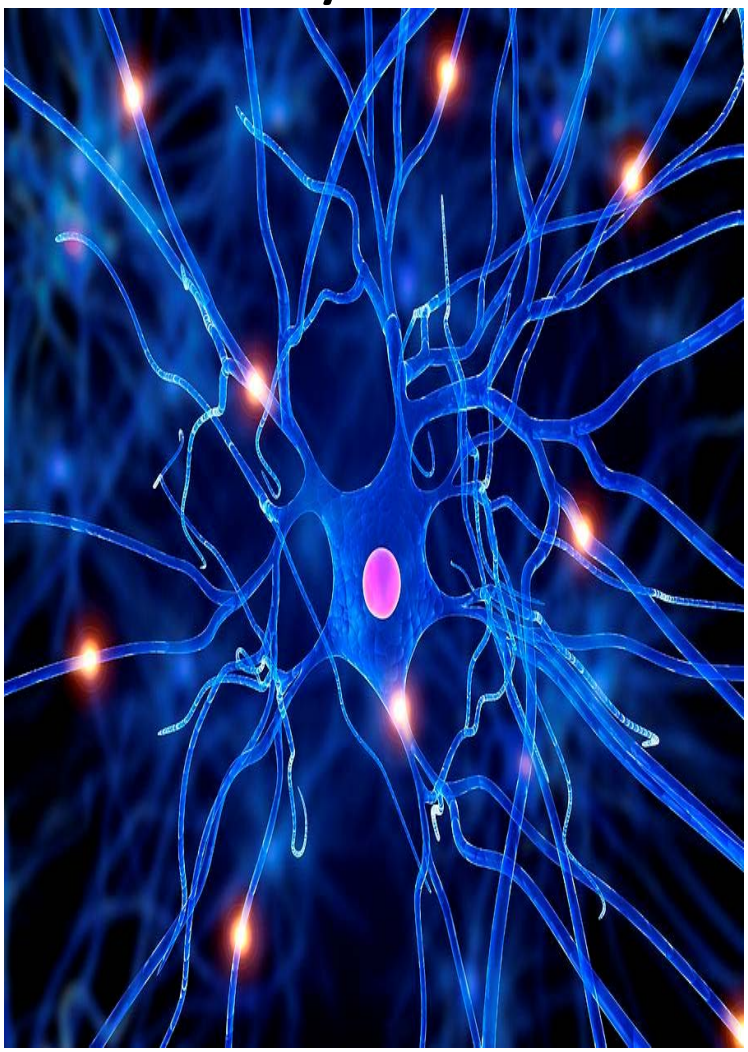
- Endocrine System: nerves tell organs which hormones to release to maintain homeostasis (Homeostatic Regulation)

A reflex arc



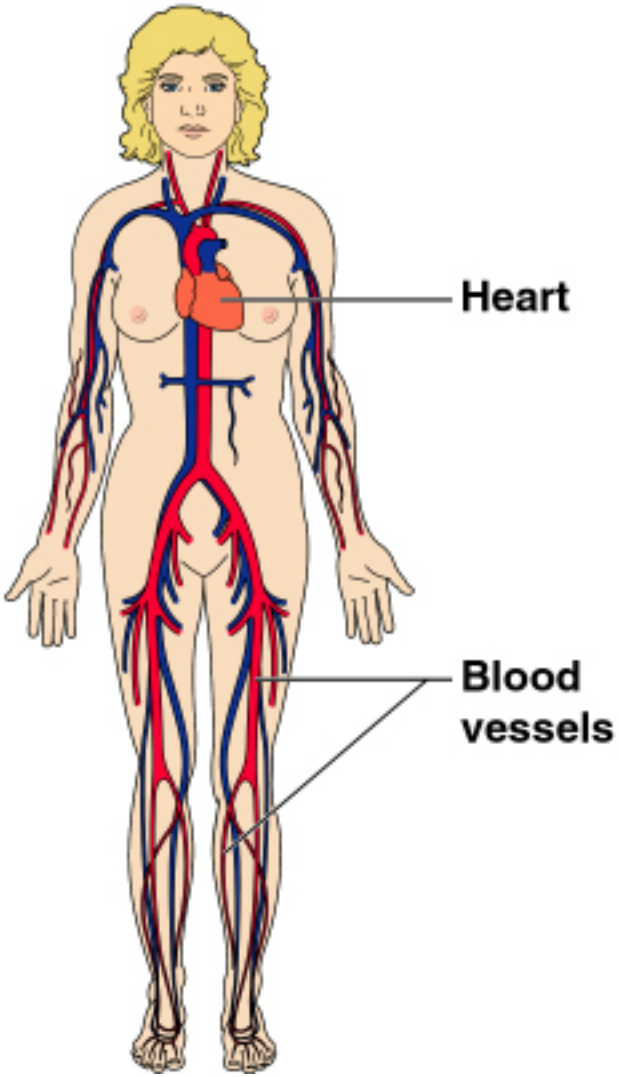
- What three systems are involved in this Reflex ARC?

Did you know!?



- Nerves can carry signals at an amazing speed of 100 meters a second...and that's not their fastest!
- You can wire a battery to the nerves of a finger and make it twitch.
- There are more nerve cells in the human brain than there are stars in the Milky Way.
- The left side of human brain controls the right side of the body and the right side of the brain controls the left side of the body.

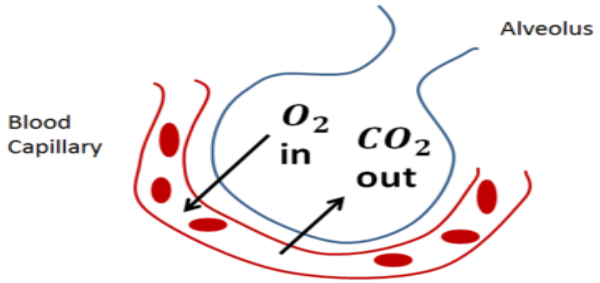
Circulatory System – aka - BLOOD



- Transports materials in body via blood pumped by heart
  - Oxygen
  - Carbon dioxide
  - Nutrients
  - Wastes
  - Hormones

How the Circulatory System works with the:

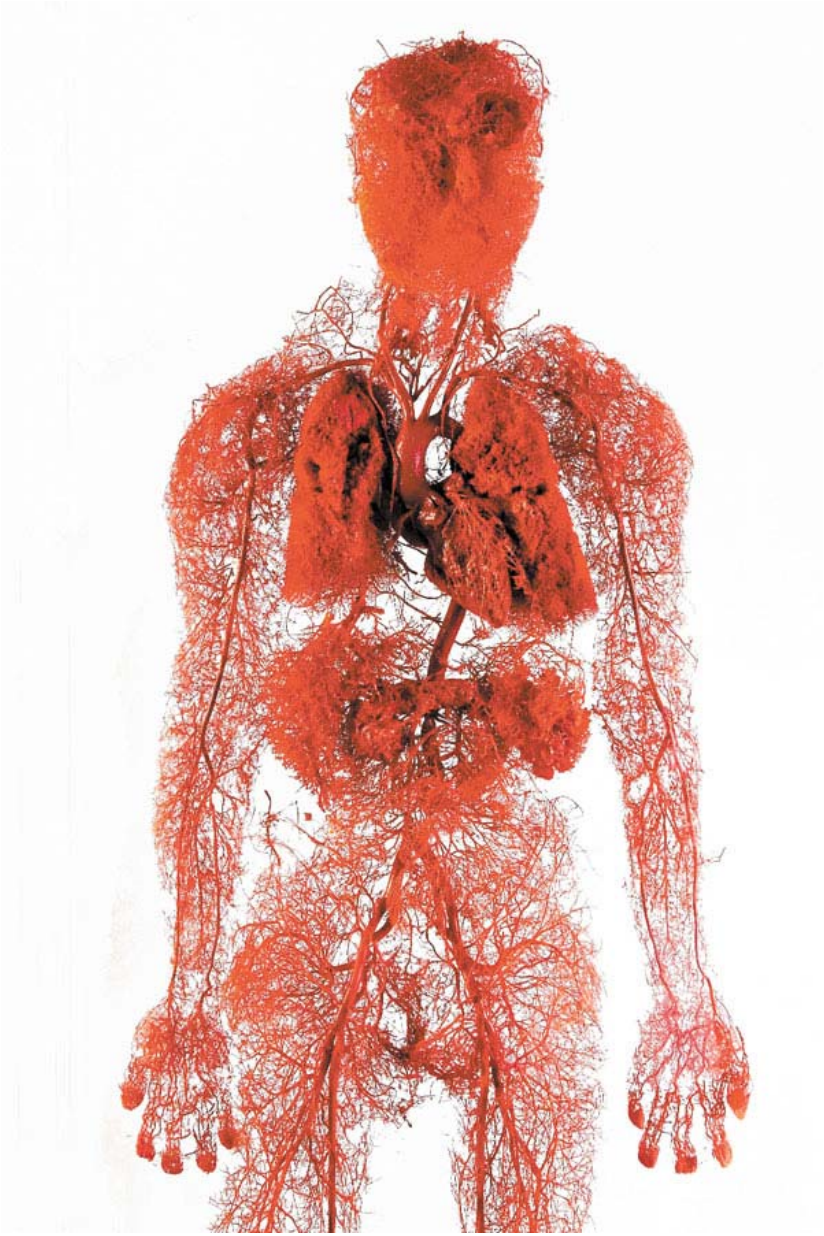
- Respiratory System – Blood carries oxygen to every cell of the body for cellular respiration in the mitochondria



- Digestive System – Blood carries nutrients through the blood

- Immune System – Blood carries white blood cells throughout the body to protect you from pathogens.

Did you know?!

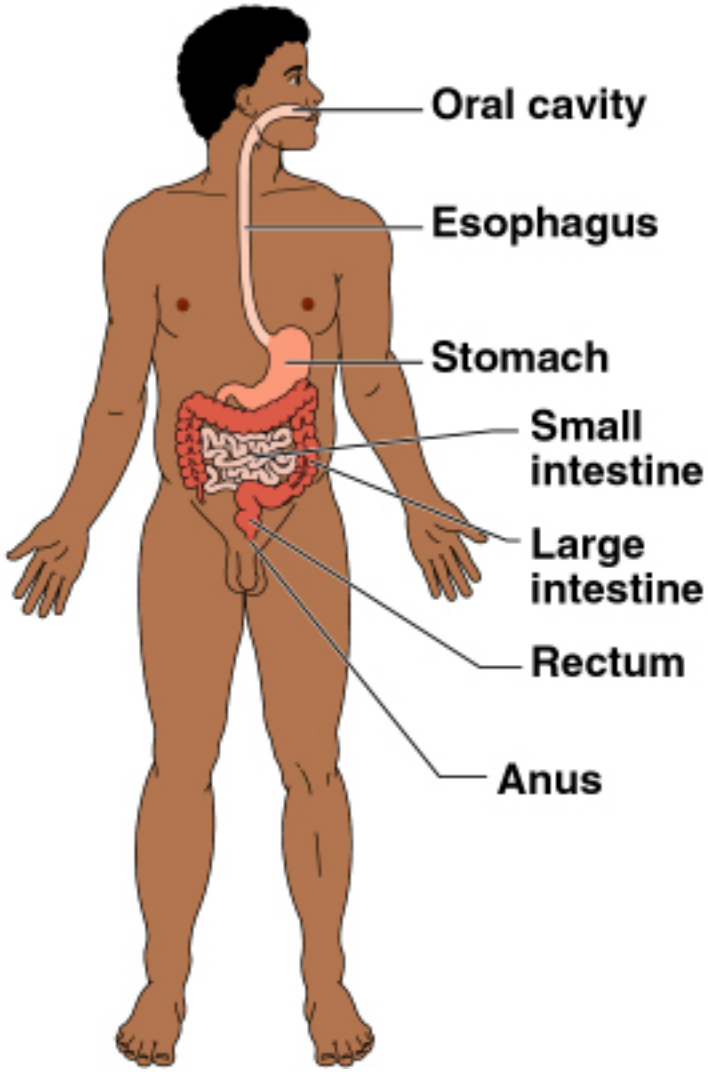


- Our body needs about 51-52 litres (11 gallons) of blood.
- If you put your circulatory system on a straight line, it is actually long enough to orbit the earth two and a half times! Also, you'd be dead.
- The heart beats around 3,000,000,000 (3 billion times) in the average person's life.
- About 8 million blood cells die in the human body every second, and the same number are born each second.
- 4. Inside a tiny droplet of blood, there are around 5 million red blood cells and up to 7,000 to 25,000 white blood cells.

  6. The reason why red blood cells are red is because they contain a protein chemical called hemoglobin which is bright red in color.

Digestive System – aka - NUTRITION

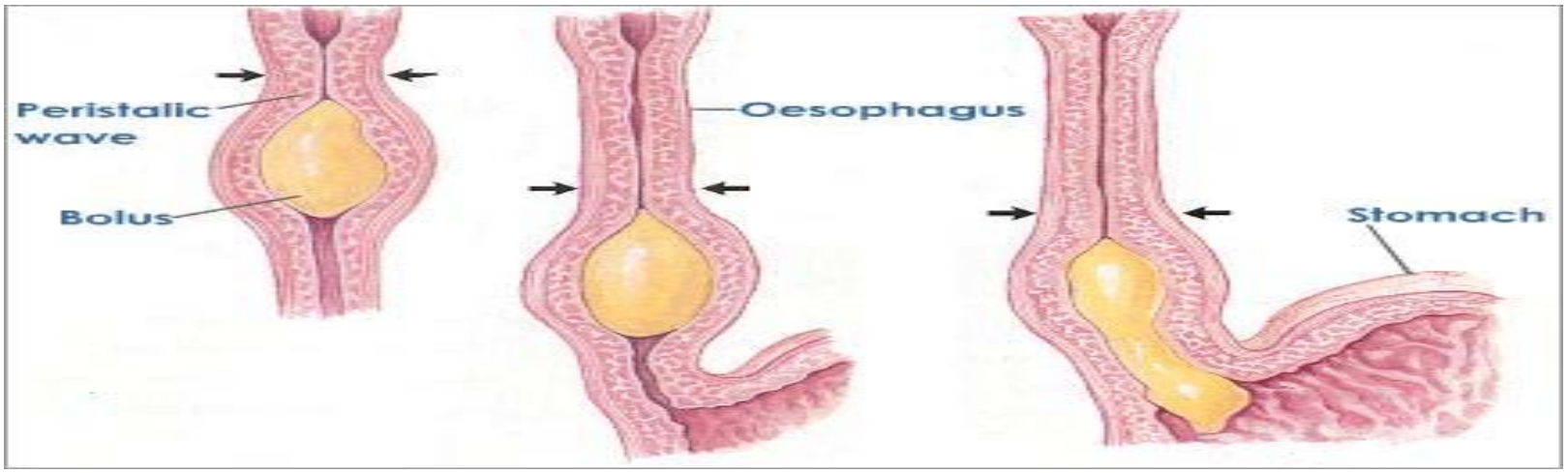
- Breaks down food nutrient absorption
- Enzymes break down food along with hydrochloric acid and bile
- Eliminates indigestible material (poop)



SYSTEM INTERACTIONS:

The DIGESTIVE SYSTEM works with:

- Circulatory system: stomach and intestines digest the nutrients that blood will carry
- Muscular system : muscular contractions move the food through the esophagus, stomach, and intestines to be digested. (peristalsis)



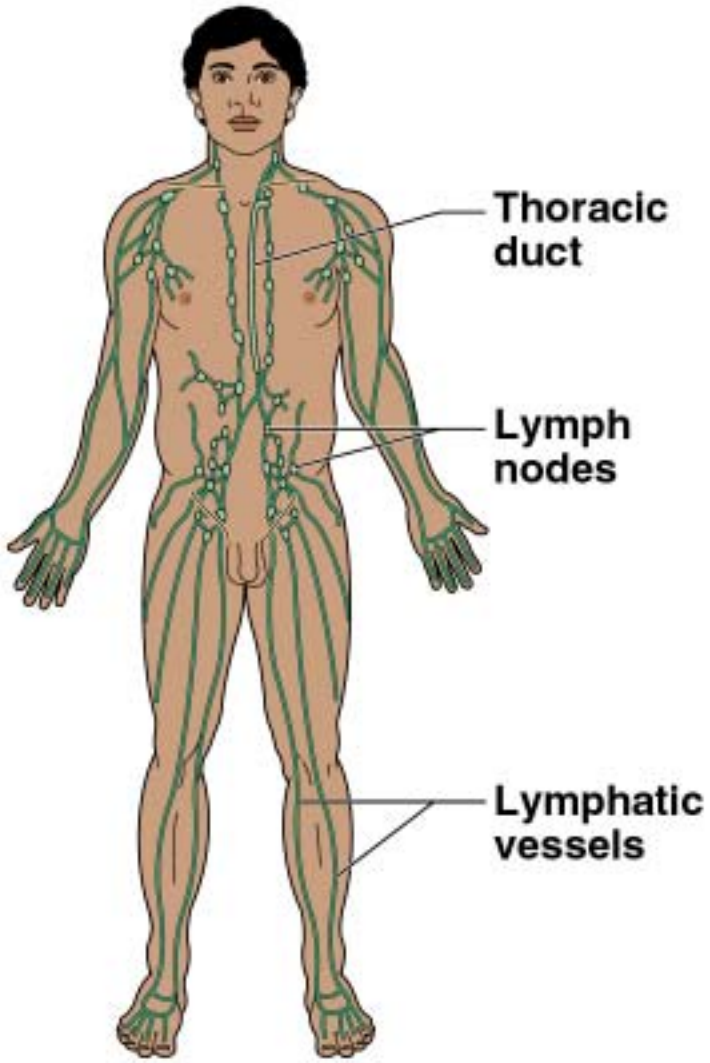
Did you know?!

- Our saliva glands produce 2 litres of saliva everyday - and we end up gulping most of them down. Yes, that's an average of 50,000 litres (5,500 gallons) spit for a lifetime!
- A man who was born without an esophagus has to literally massage his food down to his stomach every time he eats.

http://library.thinkquest.org/07aug/01618/funfacts.html

Lymphatic System – aka – Cleaning crew

- a system of capillaries, vessels, nodes and other organs
- filters and cleans the lymph of any debris, abnormal cells, or pathogens.
- Lymph - clear-to-white fluid made of white blood cells, especially lymphocytes, the cells that attack bacteria in the blood.



SYSTEM INTERACTIONS:

The LYMPHATIC SYSTEM works with:

- Immune System: to clean out the pathogens that the immune system kills.

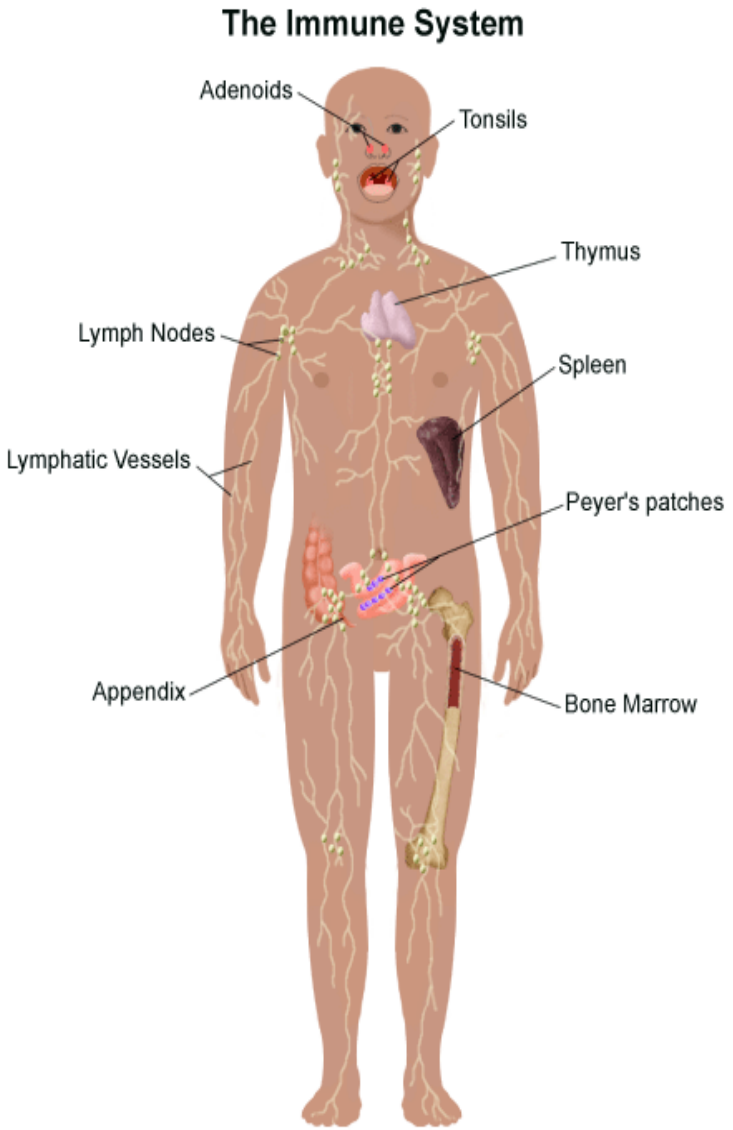
- Circulatory System: lymph nodes clean out the blood

Did you know?

- The lymphatic system is your body's sewer, the network of pipes that drains waste from the cells.
- The lymphatic system has no pump, such as the heart, to make it circulate. Instead, lymphatic fluid is circulated as a side effect of the heartbeat and muscle movement.
- When you have a cold or any other infection, the lymph nodes in your neck or groin, or under your arm, may swell, as lymphocytes fight germs. This is sometimes called 'swollen glands.

Immune System – aka – ARMY

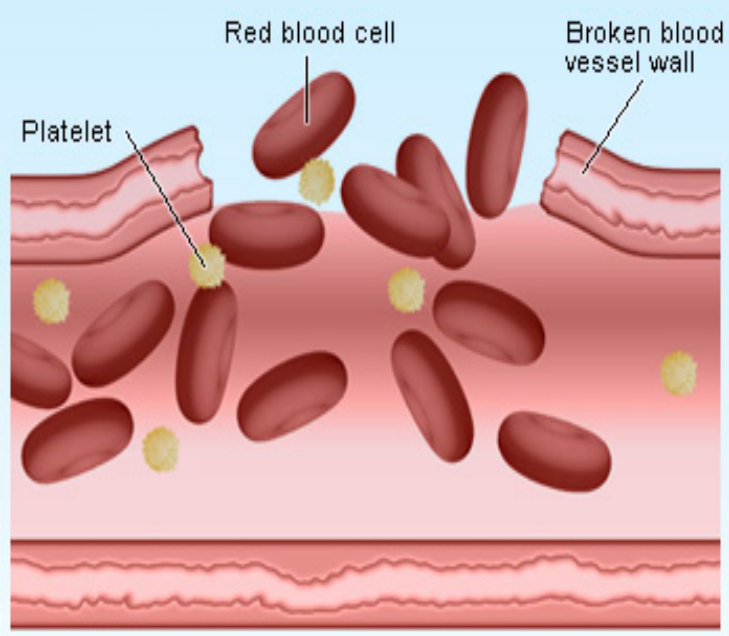
- Fights infection by organisms and foreign materials or antigens
  - Platelets seal the skin
  - T cells kill antigens in the body
  - B cells produce antibodies to prevent future infections
  - Spleen and lymph nodes clean out the blood after an infection



SYSTEM INTERACTIONS:

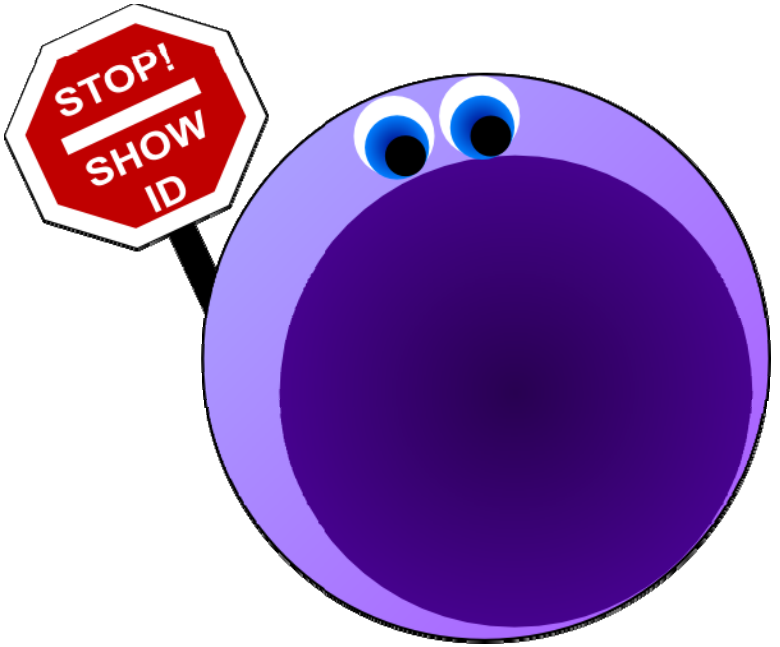
The IMMUNE SYSTEM works with:

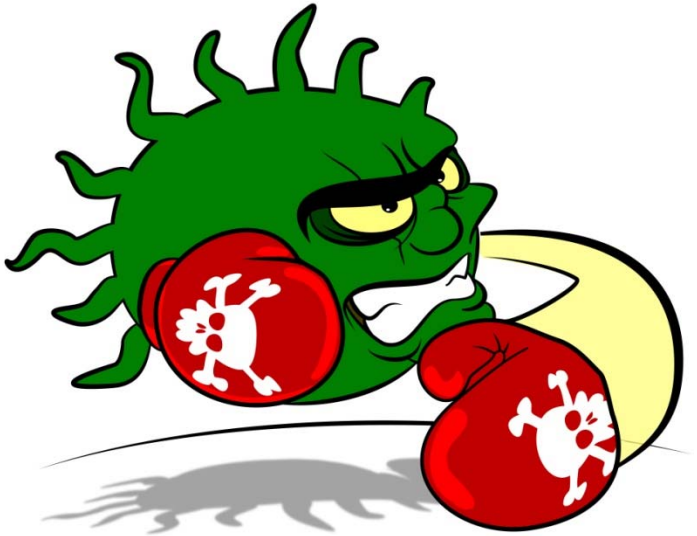
- Lymphatic system – The lymphatic cleans out pathogens that the immune system cleans
  - Integumentary system- Platelets and white blood cells rush to the site of a cut on the skin to seal the skin and fight pathogens.



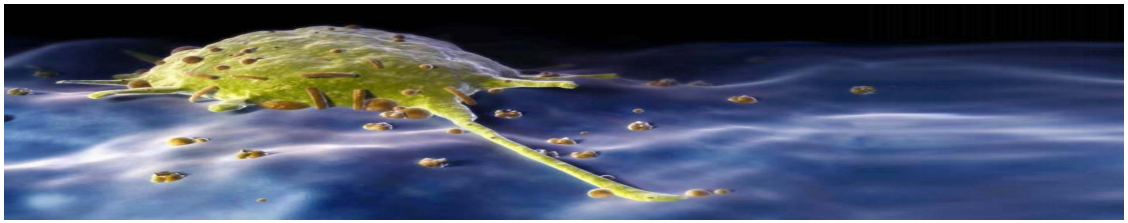
Did you know?

- Immune
  - Helper T cells recognize invaders and transform B cells into antibody-making factories
  - Killer T cells mark the invaders with antibodies for destruction by
  - Macrophages, giant white blood cells that digest the antigens.
- Fun fact: VACCINATIONS - weakened or killed pathogen particles “trick” the immune system to create antibodies that can be used to prevent future infections

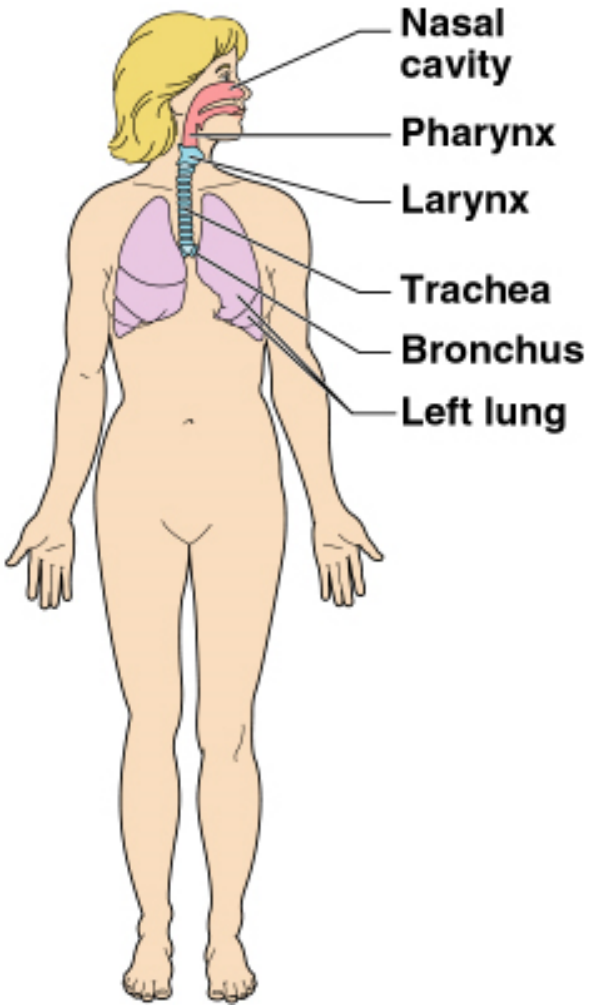




Killer T-Cell



Respiratory System – aka – Just Breathe!



- Keeps blood supplied with oxygen
- Removes carbon dioxide
- Works with the circulatory system to maintain oxygen homeostasis in the body.

SYSTEM INTERACTIONS

The RESPIRATORY SYSTEM works with:

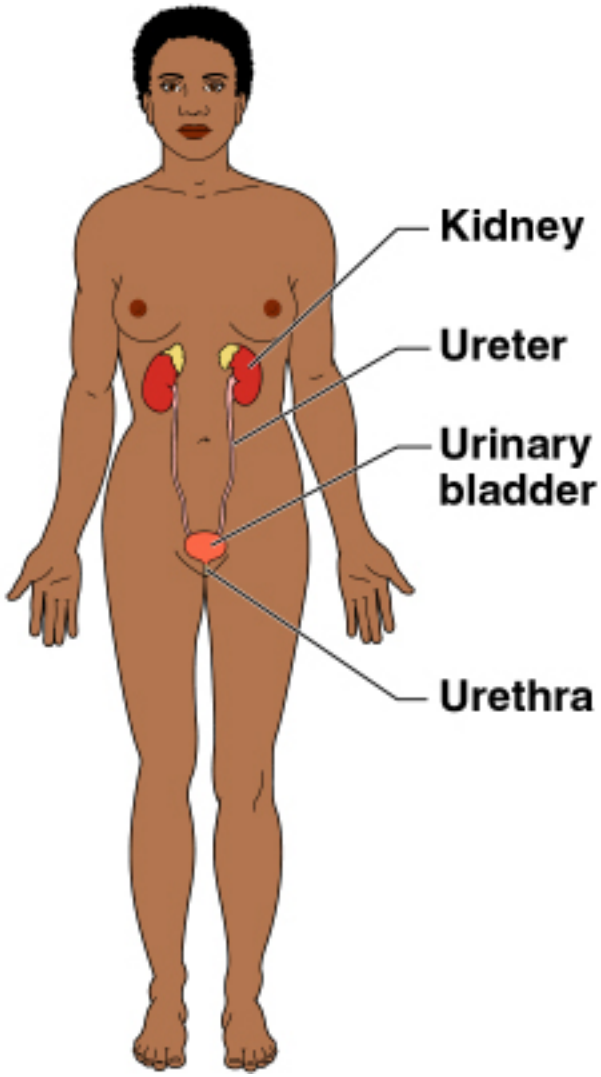
- Circulatory System: Blood delivers oxygen to every cell of the body for cellular respiration in the mitochondria.

- Muscular system: breathing rate increase during intense exercise to deliver more oxygen to muscles for ATP production.

Did you know?!

- Our lungs can hold up to six litres of air.
- Hairs in the nose help to clean the air we breathe as well as warming it.
- The highest recorded "sneeze speed" is 165 km per hour.
- The surface area of the lungs is roughly the same size as a tennis court.

Excretory/Urinary System – aka – pee!



10. Excretory/Urinary
    - Eliminates nitrogenous (cellular) wastes (pee)
    - Maintains acid – base balance in blood for homeostasis

SYSTEM INTERACTIONS:

The EXECRETORY SYSTEM works with:

- Digestive System: regulates water and electrolytes.

- Integumentary: eliminates nitrogenous wastes through sweat in the skin

- Lymphatic – Eliminates wastes cleaned from lymph nodes though urine

Did you know?

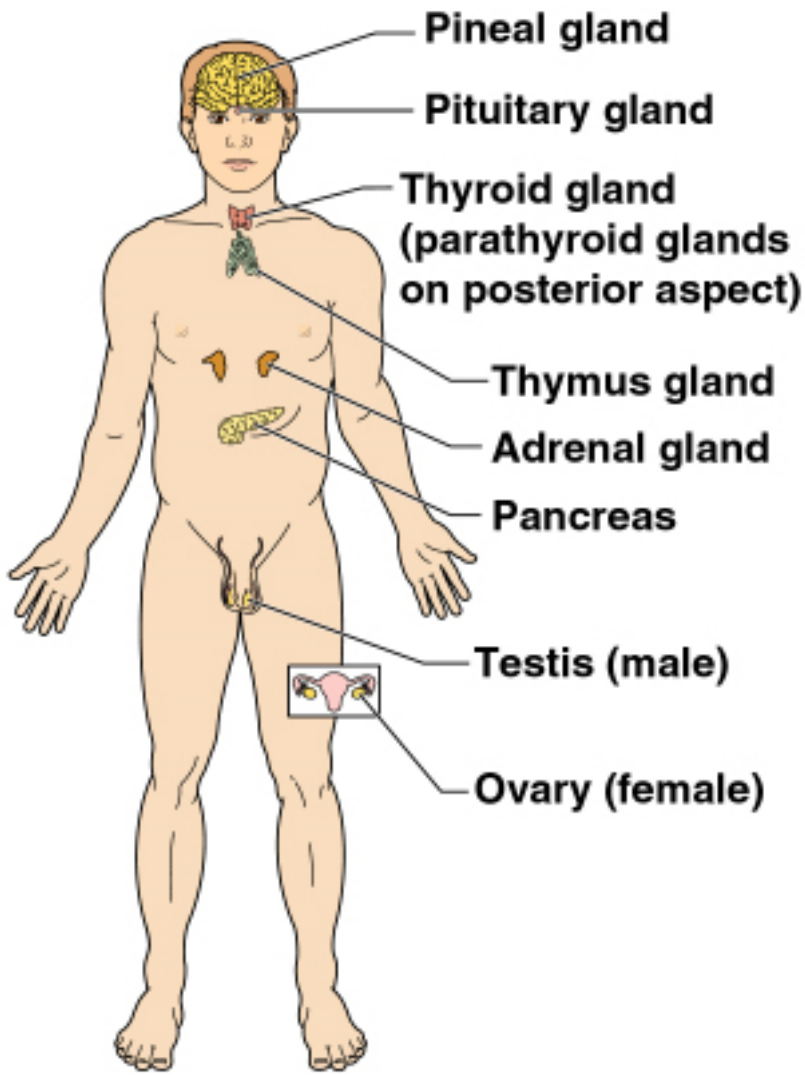
Should you drink your own pee if you need to for survival?

While drinking urine can help postpone the onset of dehydration it is not a long-term solution - it should also be noted that one of the symptoms of dehydration is a lack of urination. Drinking urine straight from "the tap" without distillation can worsen dehydration because of the high amount of salt in it.


ALL OUT OF PEE
BETTER DRINK THE JUICE FROM
THIS ELEPHANT POOP
quickmeme.com

Endocrine System – aka – HORMONES!

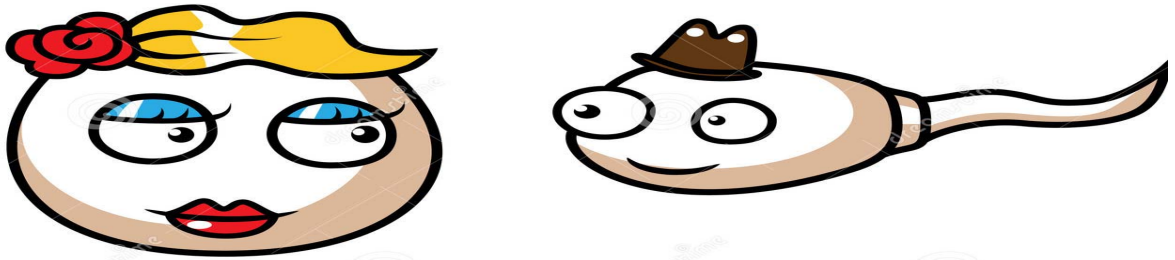
- Secretes regulatory hormones for:
  - Homeostatic Regulation (homeostasis)
  - Growth
  - Reproduction
  - Metabolism
  - Cell Differentiation
  - Sexual Function
  - Sleep
  - Mood



SYSTEM INTERACTIONS:

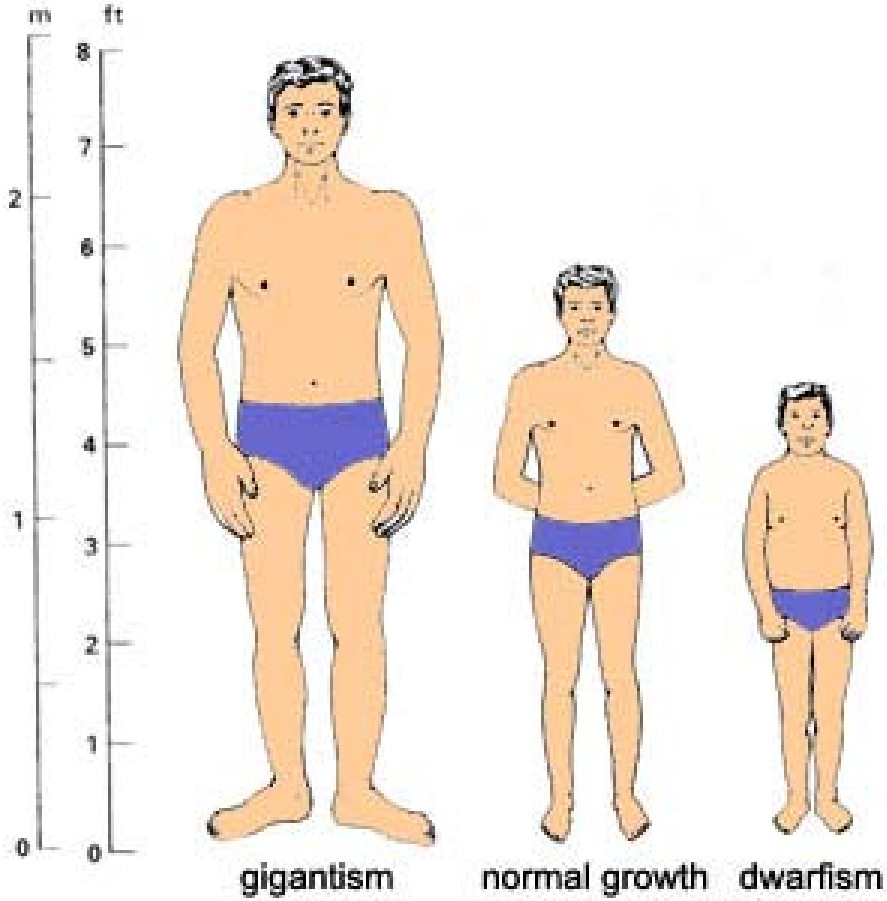
The ENDOCRINE SYSTEM works with:

- Reproductive System: Hormones encourage sperm production and egg release. Both are necessary for reproduction (eww)



- Nervous System: nerves tell organs which hormones to release (**Homeostatic Regulation**)

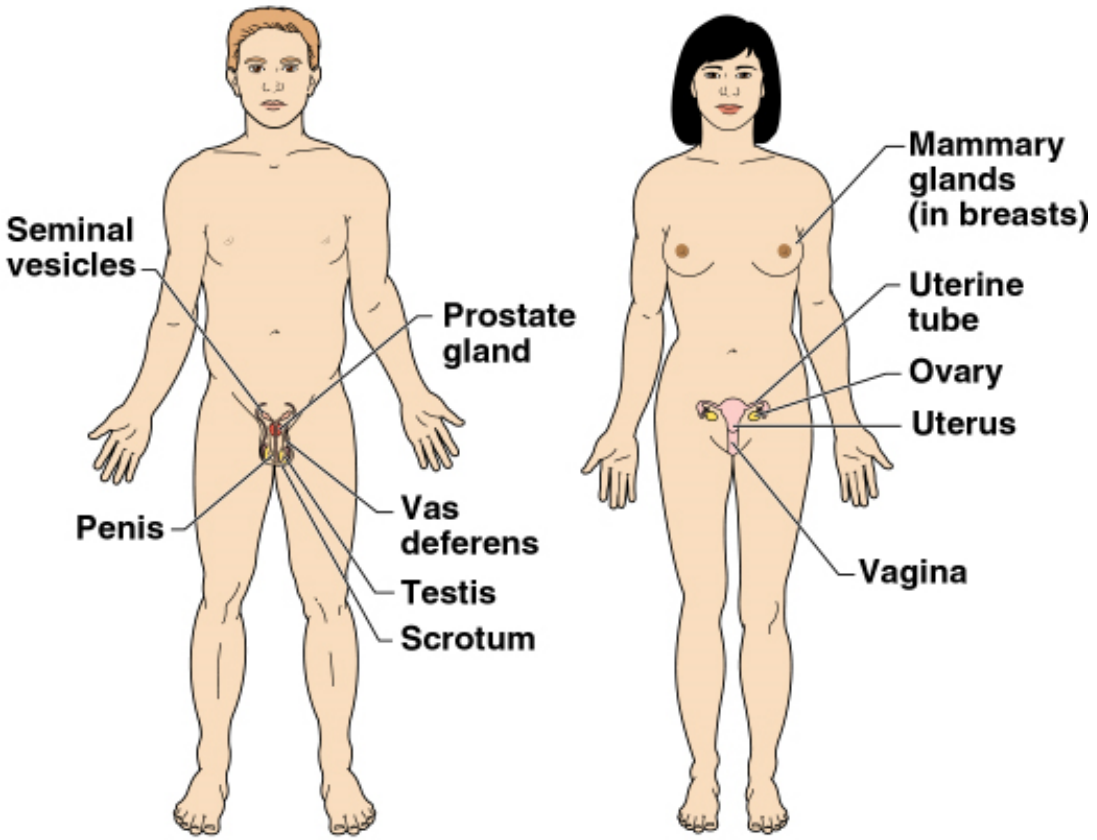
Did you know?



- 1. The hypothalamus is the one that makes you feel hunger and thirst. It also helps in body temperature.
  2. It aids the immune system by helping the body build resistance to disease.
  3. The human behavior is also controlled by the endocrine system when it affects the nervous system.
  4. We must be thankful to the pineal gland for our sweet sleep. It secretes melatonin which regulates our sleep.
  5. There are 30 hormones in the human body.

Reproductive System - aka. SEX!

- Produces haploid gametes (sperm and egg) for sexual reproduction of offspring



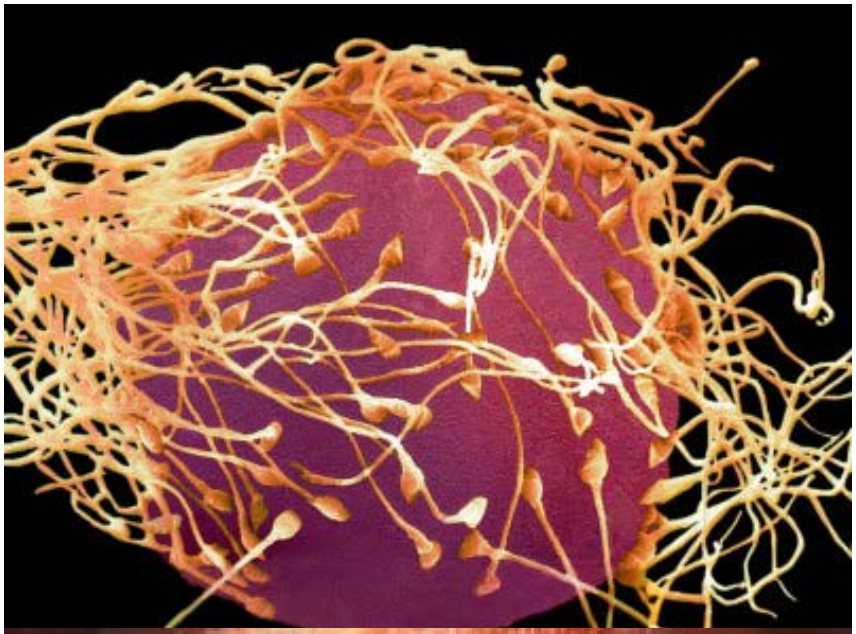
SYSTEM INTERACTIONS

The REPRODUCTIVE SYSTEM works with:

- Endocrine: Hormones like testosterone and estrogen are necessary for reproduction of egg and sperm.

- Circulatory: A developing fetus receive all the nutrition and oxygen through the blood delivered through the umbilical cord.

Did you know?



- About 500 million sperm mature every day in a normal male adult. The average life span of a sperm is about 36 hours.
- The female human body is capable of giving birth to 35 children in one lifetime.
- Every human spent about half an hour in a single cell. All life has to start somewhere, and even the largest humans spent a short part of their lives as a single celled organism when sperm and egg cells first combine. Shortly thereafter, the cells start to divide rapidly and start the formation of tiny components of the embryo.