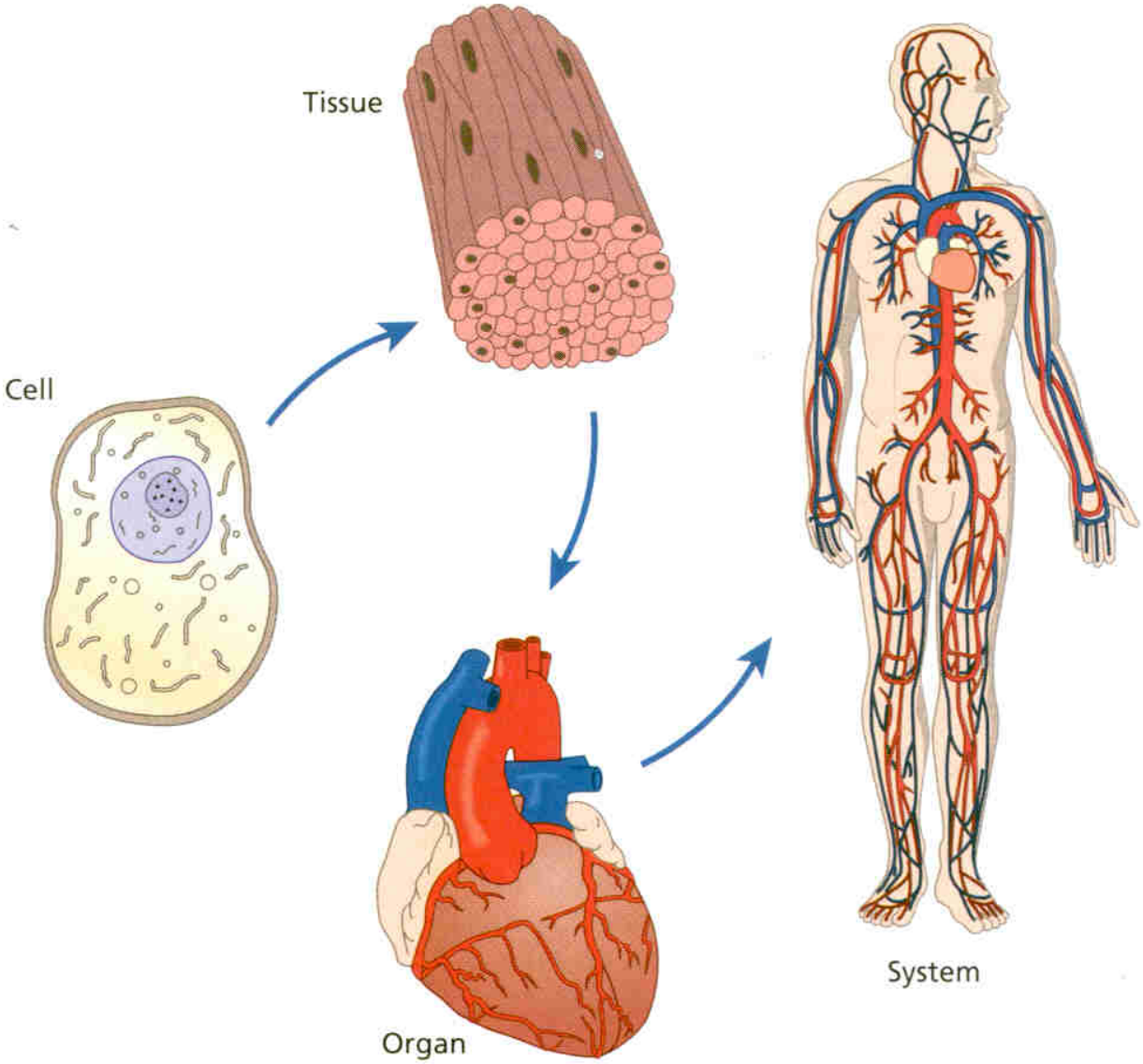
CHAPTER SIX:
UNDERSTANDING BODY STRUCTURE AND FUNCTION
CHAPTER SEVEN:
CARING FOR THE OLDER PERSON

ORGANIZATION



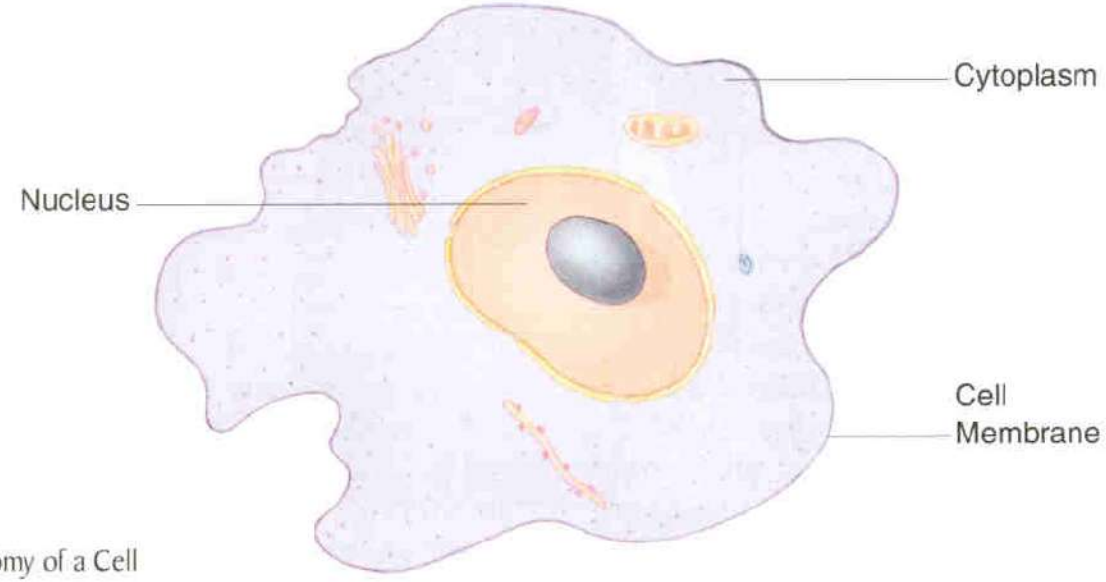
BASIC BODY STRUCTURE

THE CELL IS THE BASIC UNIT IN ALL LIVING THINGS.

CELLS ARE MICROSCOPIC.

YOUR BODY HAS MANY DIFFERENT KINDS OF CELLS, EACH WITH A SPECIAL FUNCTION.

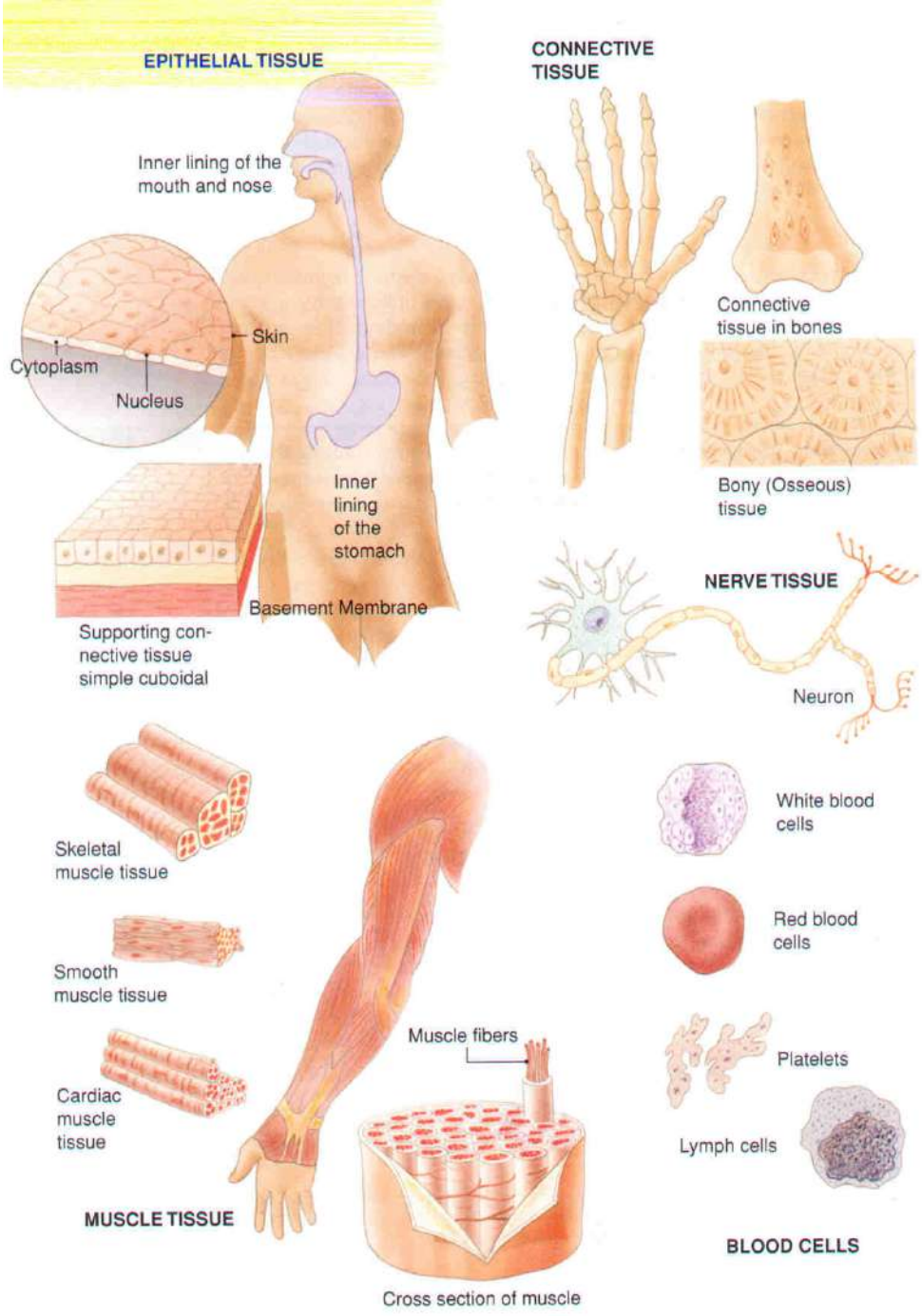
GROUPS OF CELLS WITH SIMILAR FUNCTIONS COMBINE TO FORM TISSUES.



Anatomy of a Cell

TISSUE

A TISSUE IS A GROUP OF SIMILAR CELLS THAT WORK TOGETHER TO PERFORM A PARTICULAR FUNCTION.

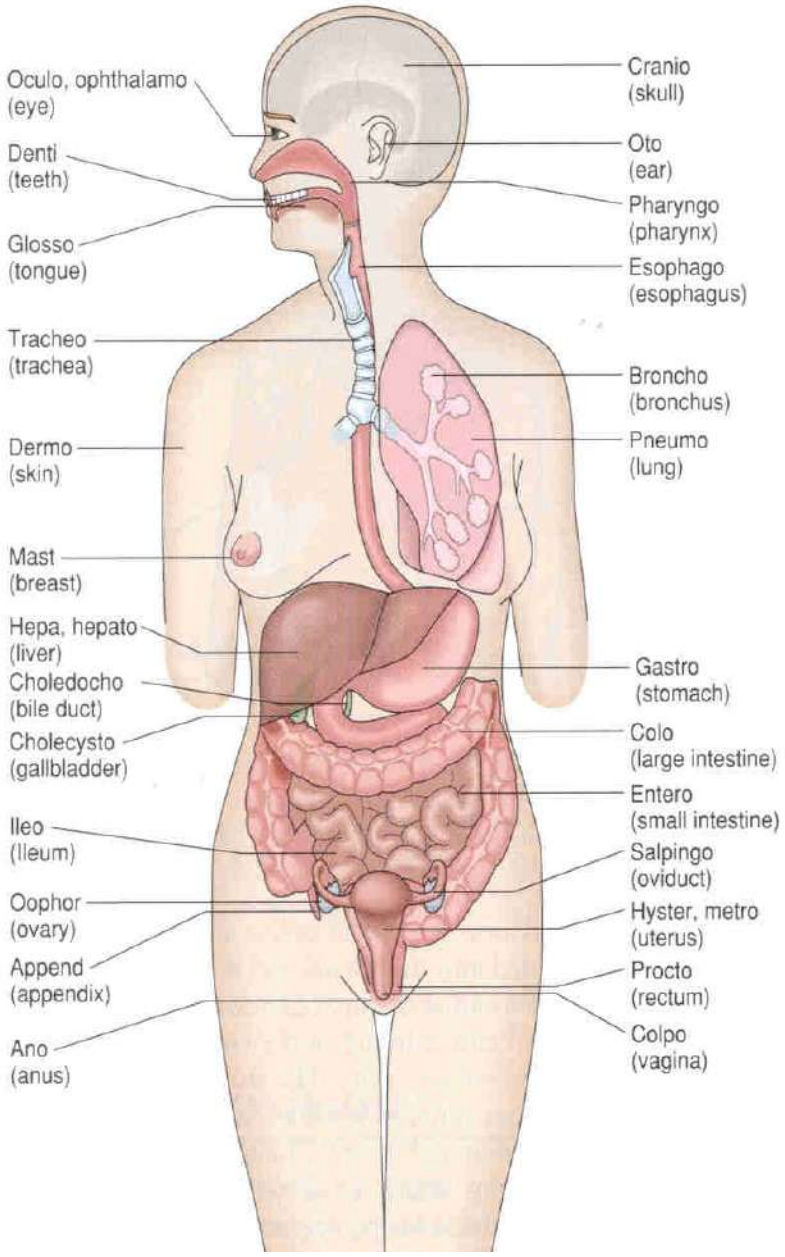


Four Basic Kinds of Tissue

Type of Tissue	Function	Location
Epithelial	Covers the internal and external surfaces of the body and protects it; receives sensations; secretes and absorbs.	Skin; lining of mouth, nose, and stomach.
Connective	Holds other tissues together.	Blood; bones; tendons; layer of fat under skin.
Muscle	Enables the body to move by stretching and contracting.	Arms; legs; abdomen; back; walls of organs.
Nerve	Carries messages to and from brain and regulates body functions.	Throughout the body.

ORGAN

AN ORGAN IS A GROUP OF SIMILAR TISSUES THAT WORK TOGETHER TO PERFORM A PARTICULAR FUNCTION.



SYSTEM

A GROUP OF ORGANS THAT WORK TOGETHER TO PERFORM ONE OR MORE FUNCTIONS IS CALLED A SYSTEM.

EACH SYSTEM PERFORMS CERTAIN FUNCTIONS, BUT NO SYSTEM WORKS TOTALLY INDEPENDENTLY.

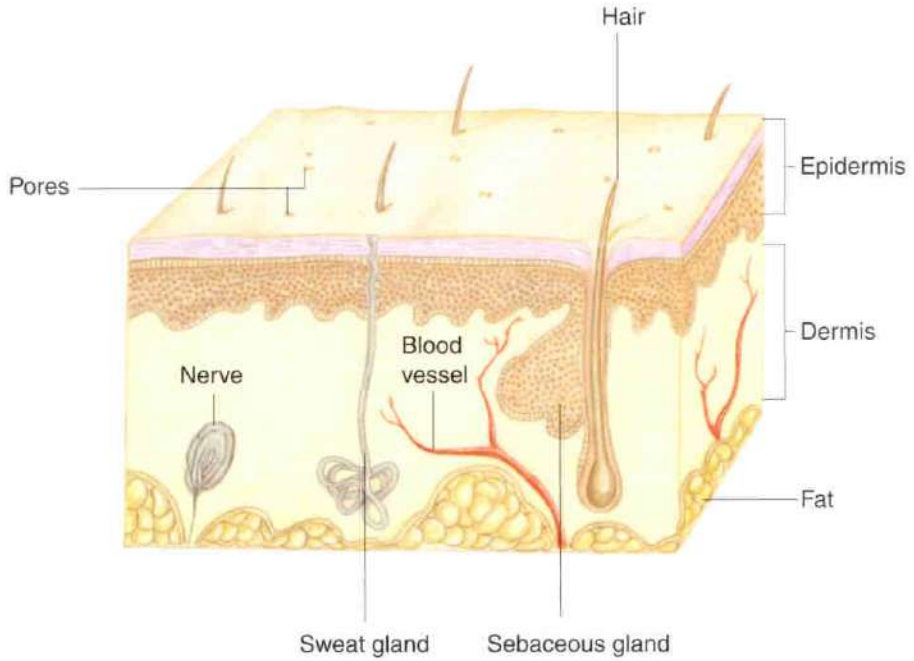
A CHANGE IN ANY ONE SYSTEM WILL AFFECT THE OTHERS.

BODY SYSTEMS

- INTEGUMENTARY
- MUSCULOSKELETAL
- RESPIRATORY
- CIRCULATORY
- DIGESTIVE
- URINARY
- NERVOUS
- ENDOCRINE
- REPRODUCTIVE
- LYMPHATIC
- IMMUNE

INTEGUMENTARY SYSTEM

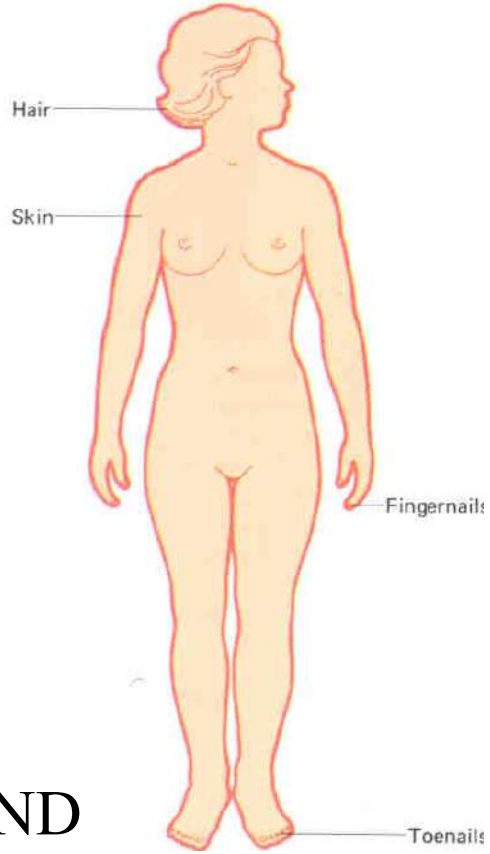
- LARGEST SYSTEM IN THE BODY
- COMPOSED OF THE SKIN, NAILS, HAIR, SWEAT GLANDS, AND OIL GLANDS
- THE SKIN HAS TWO LAYERS THE DERMIS AND THE EPIDERMIS



Structure of the Skin

FUNCTIONS OF THE INTEGUMENTARY SYSTEM

- IT IS THE BODY'S PROTECTIVE COVERING
- PROTECTION OF INTERNAL TISSUES AND ORGANS
- PROTECTION AGAINST INFECTION
- PREVENTS LOSS OF WATER
- ELIMINATION OF WASTE
- STORAGE OF NUTRIENTS
- DETECTION OF TOUCH, PRESSURE, PAIN, AND TEMPERATURE



CHANGES OF AGING

- SKIN BECOMES THINNER AND MORE FRAGILE
- SKIN LOSES ITS ELASTICITY CAUSING WRINKLES AND SAGGING
- OIL GLANDS ARE LESS ACTIVE CAUSING DRY SKIN
- LOSS OF FAT LAYER LEAVES THE SKIN WITH LESS PROTECTION AND LESS INSULATION
- DECREASED SENSITIVITY OF NERVE ENDINGS
- HAIR COLOR FADES
- NAILS BECOME THICK AND TOUGH
- DEVELOPMENT OF SKIN IRREGULARITIES SUCH AS SKIN TAGS, MOLES, AND WARTS
- DEVELOP BROWN SPOTS ON WRISTS AND HANDS

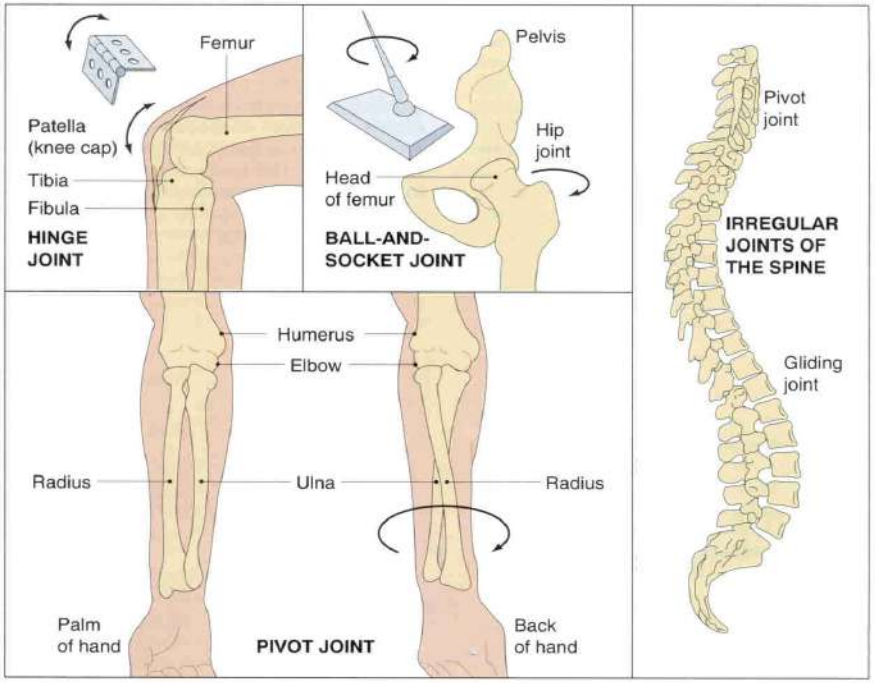
NURSING CARE: INTEGUMENTARY SYSTEM

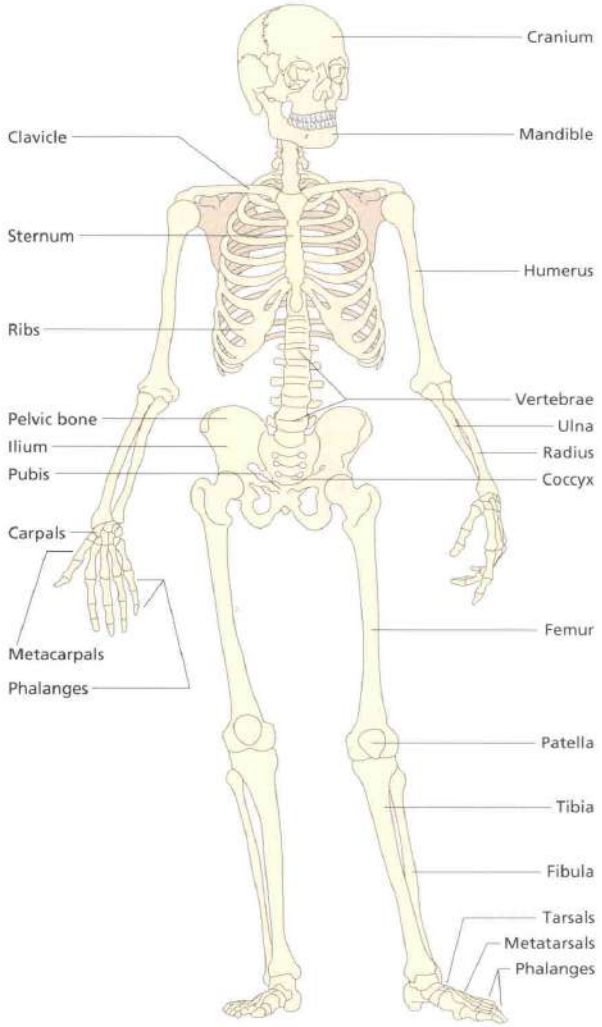
- PREVENT SKIN BREAKDOWN
- PROTECT FROM INJURIES DUE TO LOSS OF SENSATION
- KEEP WARM AND AWAY FROM DRAFTS
- APPLY LOTIONS OR CREAMS TO PREVENT DRY SKIN
- BATHE ONLY ONCE OR TWICE A WEEK TO PREVENT DRY SKIN
- HAVE RN SCHEDULE PODIATRIST FOR NAIL CARE
- APPLY SOCKS TO KEEP THE FEET WARM
- ASSIST WITH NUTRITION

MUSCULOSKELETAL SYSTEM

- COMPOSED OF BONES AND JOINTS
- JOINTS ARE PLACES WHERE BONES COME TOGETHER AND THERE IS THE POSSIBILITY OF MOVEMENT
- BONES ARE CONNECTED TO EACH OTHER BY <u>LIGAMENTS</u>

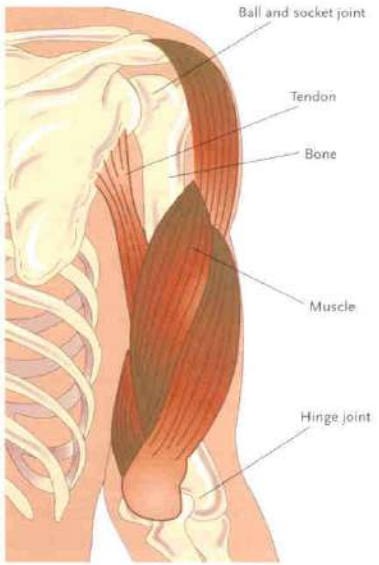
206 BONES IN OUR BODY

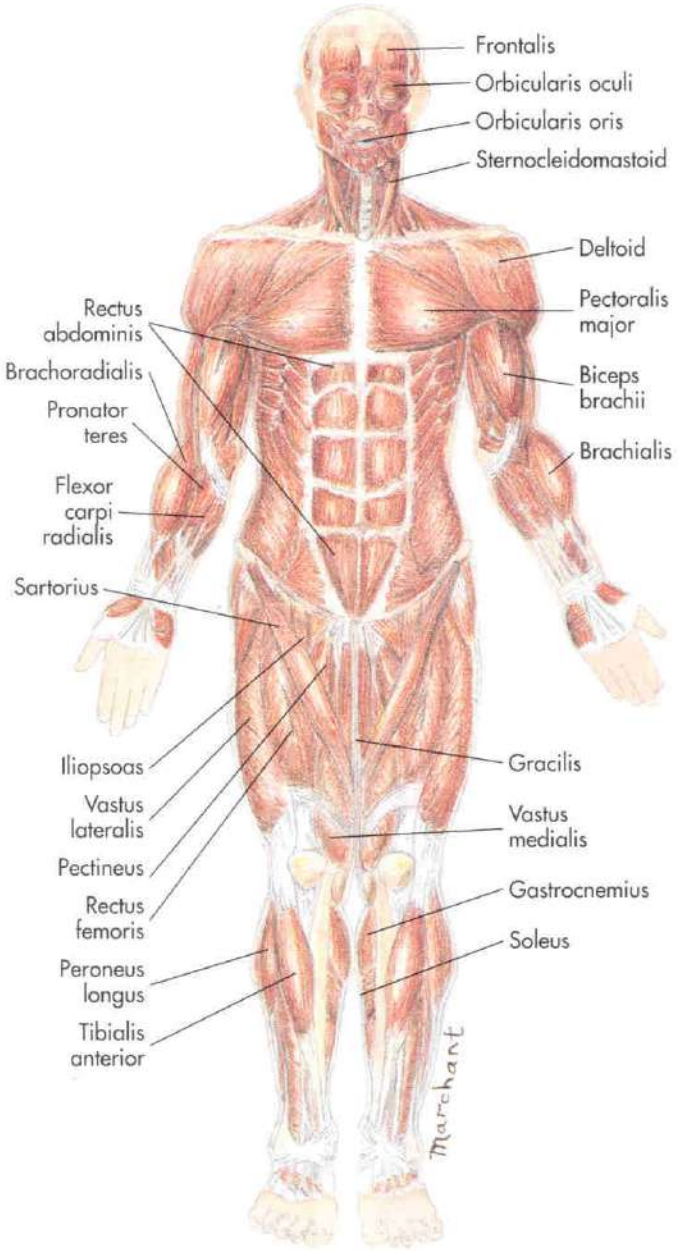




MUSCLES

- 3 TYPES OF MUSCLE TISSUE
- SKELETAL
- SMOOTH
- CARDIAC
- MUSCLES MAY BE VOLUNTARY OR INVOLUNTARY
- TENDONS CONNECT MUSCLE TO BONE
- LIGAMENTS CONNECT BONE TO BONE





FUNCTIONS OF THE MUSCULOSKELETAL SYSTEM

- PROVIDES STRUCTURAL SUPPORT AND FRAMEWORK FOR THE BODY
- PRODUCE MOVEMENT
- PROTECT TISSUES AND ORGANS
- PRODUCE BLOOD CELLS IN BONE MARROW
- MAINTAIN POSTURE AND BODY POSITION
- MAINTAIN BODY TEMPERATURE

CHANGES OF AGING

- STRENGTH AND ENDURANCE DECREASE
- BODY MOVEMENTS SLOW
- MUSCLES WEAKEN, BECOME SMALLER, AND LOSE ELASTICITY
- MUSCLE WEAKNESS CAN AFFECT ANY SYSTEM OF THE BODY
- JOINTS BECOME STIFF
- BONES BECOME THIN AND BRITTLE AND CAN BE EASILY BROKEN
- CHANGES IN THE SPINAL COLUMN RESULT IN STOOPED POSTURE

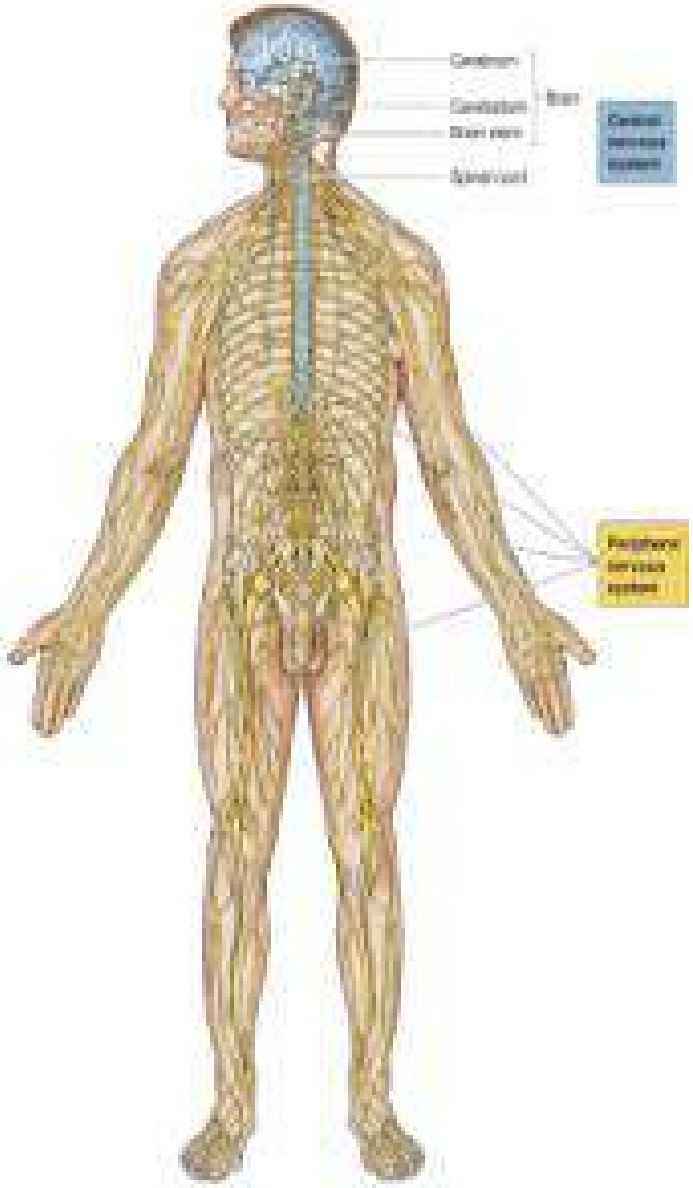
NURSING CARE:

- PROTECT AGAINST FALLS
- MOVE PERSON GENTLY
- ASSIST WITH AMBULATION
- ASSIST WITH RANGE-OF-MOTION EXERCISES
- ASSIST WITH NUTRITION

THE NERVOUS SYSTEM

COMPOSED OF THE BRAIN, SPINAL CORD, AND NERVES.

DIVIDED INTO TWO PARTS – THE CENTRAL NERVOUS SYSTEM AND THE PERIPHERAL NERVOUS SYSTEM.



FUNCTIONS OF THE NERVOUS SYSTEM

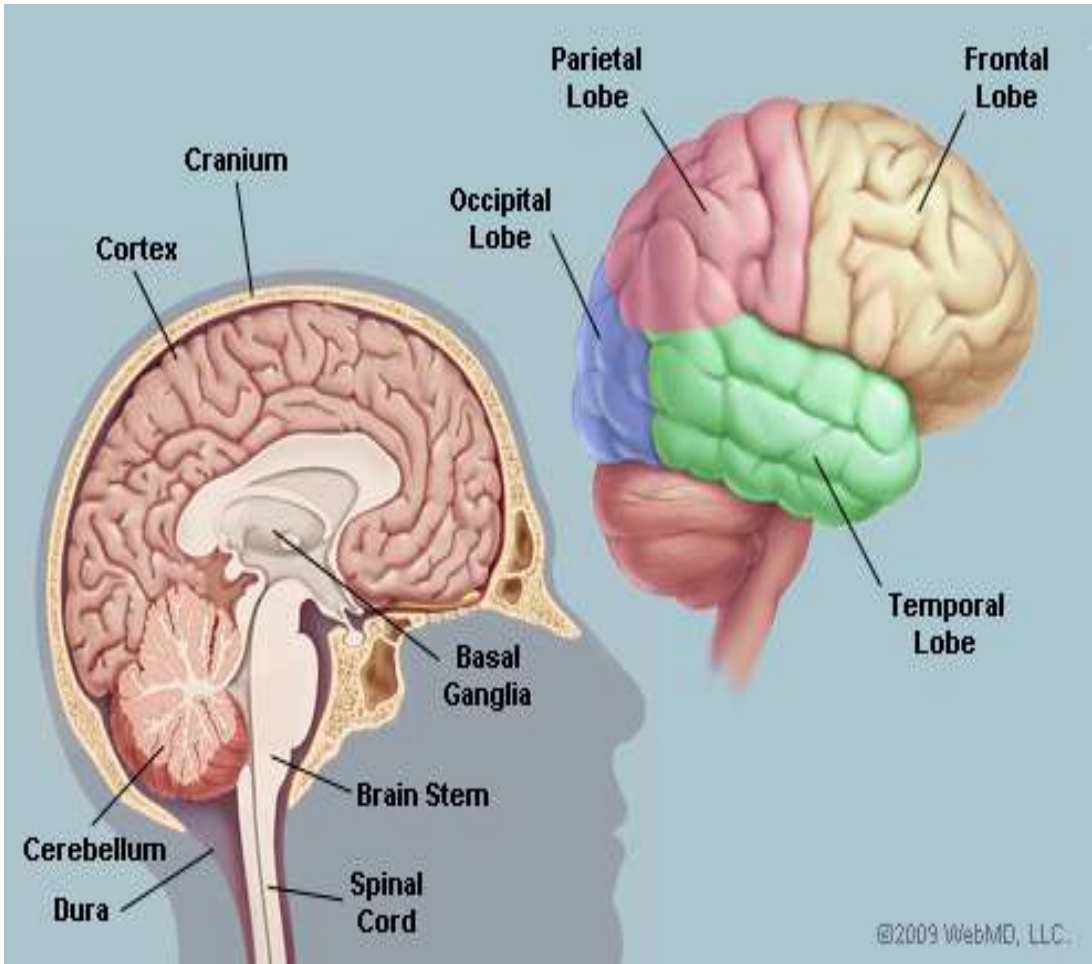
- CONTROLS AND COORDINATES BODY ACTIVITIES
- PROVIDES SENSATIONS FROM THE ENVIRONMENT
- THE BODY'S COMMUNICATION CENTER
- CONTROLS THE PRODUCTION OF HORMONES

CENTRAL NERVOUS SYSTEM

MADE UP THE BRAIN AND SPINAL CORD

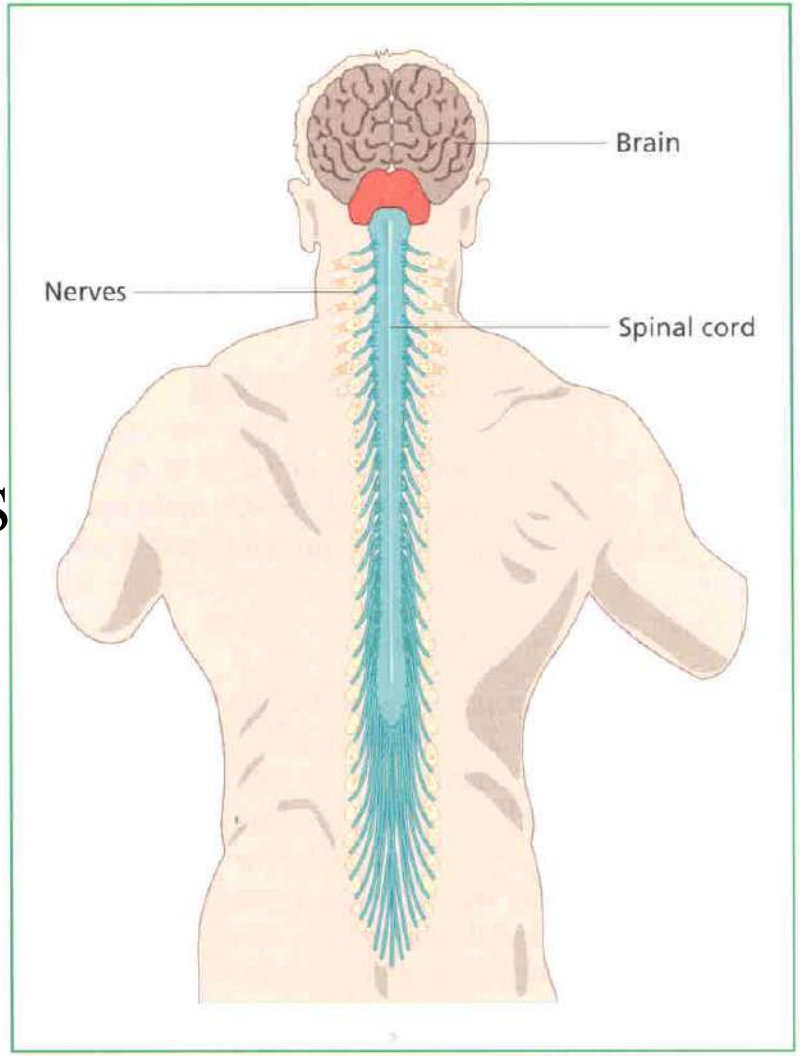
THE BRAIN

- COORDINATES MOST BODY ACTIVITIES
- EACH PART OF THE BRAIN CONTROLS SPECIFIC FUNCTIONS
- THE RIGHT SIDE OF THE BRAIN CONTROLS THE LEFT SIDE OF THE BODY AND VICE VERSA
- THE BRAIN IS PROTECTED BY THE SKULL



SPINAL CORD

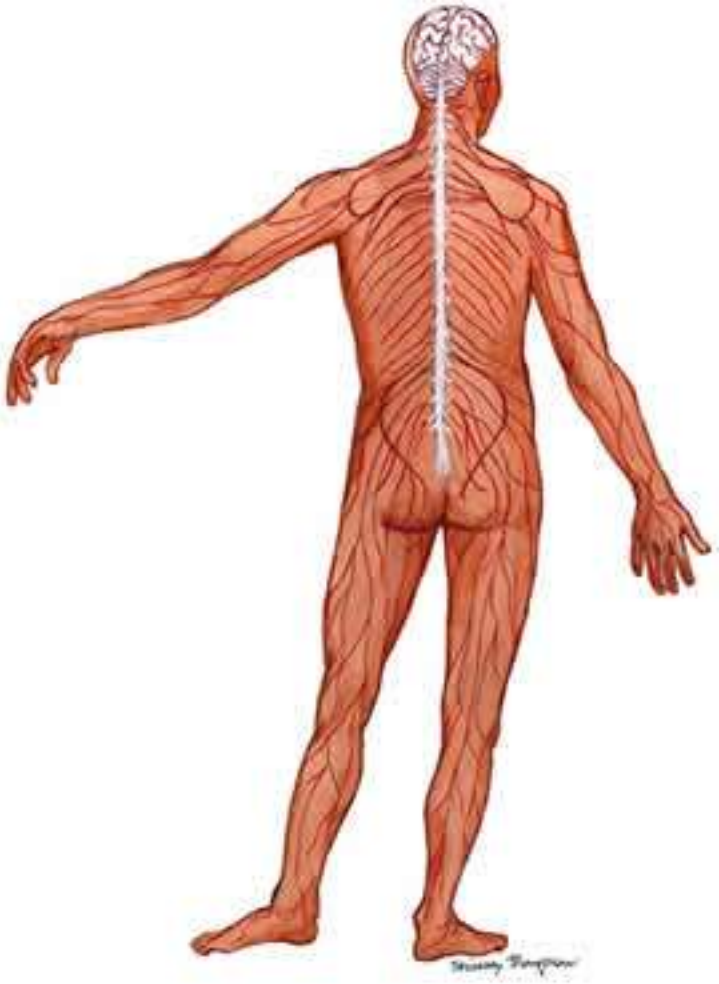
- NERVES ENTERING AND LEAVING THE SPINAL CORD CARRY IMPULSES TO AND FROM THE BRAIN
- THE BRAIN AND SPINAL CORD MAKE UP THE CENTRAL NERVOUS SYSTEM



PERIPHERAL NERVOUS SYSTEM

NERVES

- NERVES CARRY IMPULSES TO AND FROM THE BRAIN
- 12 PAIRS OF CRANIAL NERVES
- CONDUCT IMPULSES BETWEEN THI BRAIN AND THE HEAD, NECK, CHEST, AND ABDOMEN
- 31 PAIRS OF SPINAL NERVES
- CONDUCT THE IMPULSES FROM THI SKIN, ARMS, LEGS, AND INTERNAL STRUCTURES



CHANGES OF AGING

- THE NUMBER OF NEURONS (BRAIN CELLS) DECREASE
- THERE IS REDUCED BLOOD FLOW TO THE BRAIN
- TRANSMISSION OF MESSAGES IS DELAYED, RESULTING IN SLOWER RESPONSES AND REFLEXES
- SHORT TERM MEMORY LOSS MAY OCCUR
- DECREASE IN SENSITIVITY OF NERVE ENDINGS IN THE SKIN

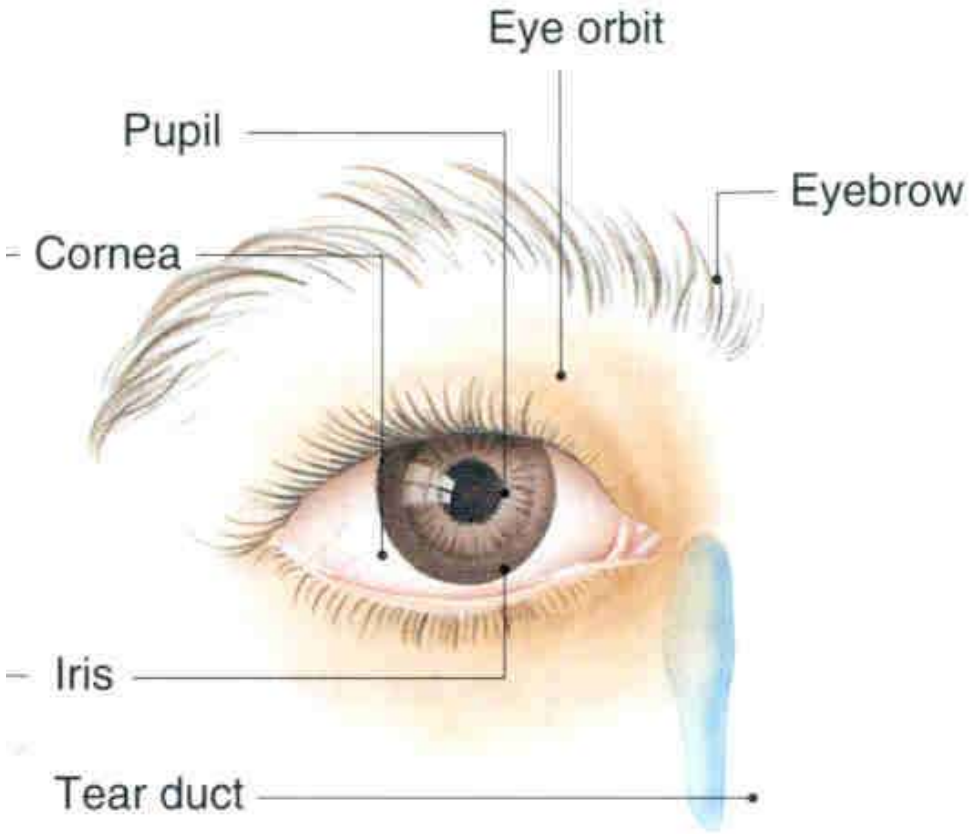
NURSING CARE: NERVOUS SYSTEM

- PROTECT FROM FALLS AND INJURIES
- PROVIDE REST PERIODS

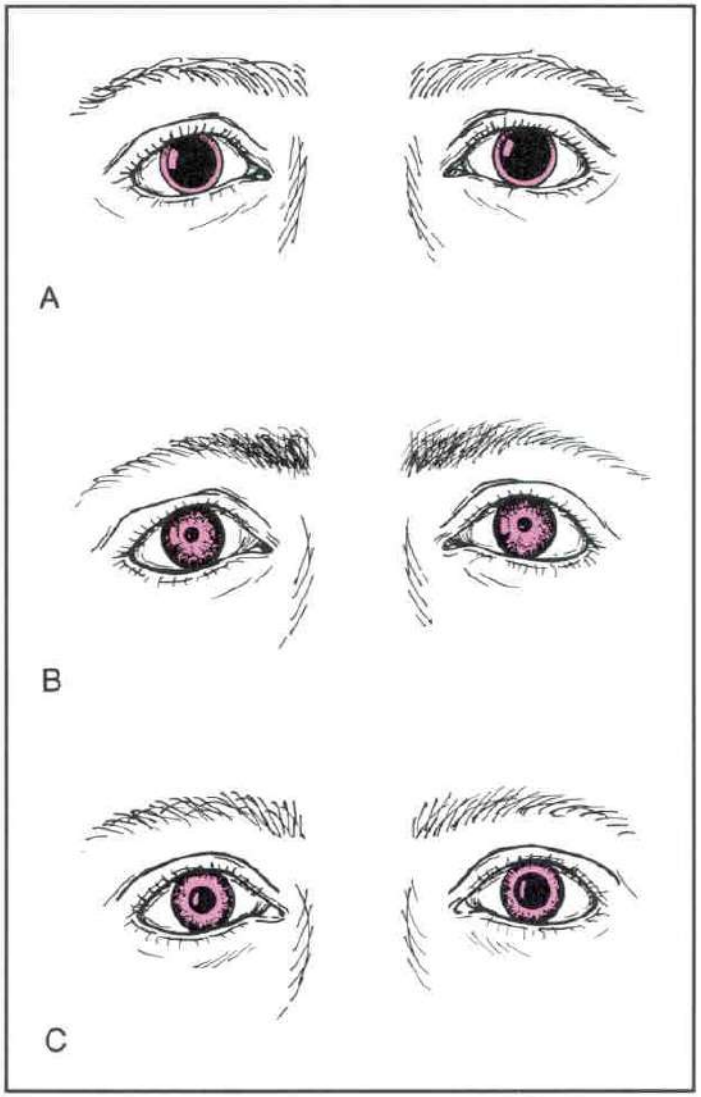
SPECIAL SENSES

EYE

- SENSE ORGAN FOR VISION
- THE WHITE PART OF THE EYE IS CALLED THE SCLERA
- THE COLORED PART OF THE EYE IS THE IRIS
- THE ROUND DARK OPENING THAT CHANGES SIZE IS THE PUPIL



DIFFERENT PUPIL SIZE



DILATED

PINPOINT

UNEQUAL

FIGURE 18–3
Pupil sizes. A, Dilated. B, Pinpoint. C, Unequal.

SPECIAL SENSES

EAR

- THE EAR IS RESPONSIBLE FOR HEARING AND BALANCE

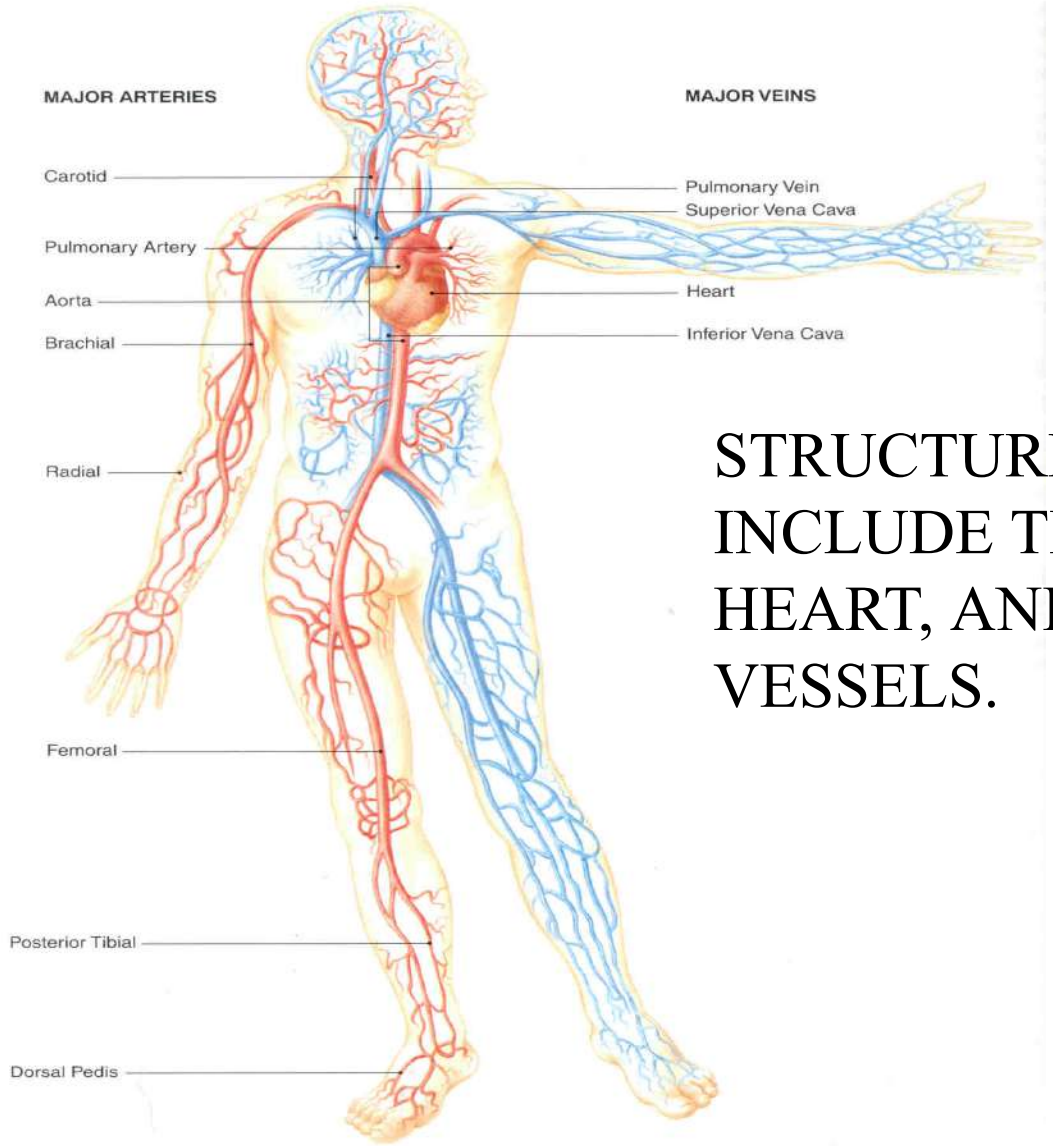
CHANGES IN AGING

- THE EYE TAKES LONGER TO ADJUST TO LIGHT
- NIGHT VISION DECREASES
- HEARING RECEPTORS ARE LESS SENSITIVE
- SENSE OF SMELL DECREASES
- DECREASE IN THE NUMBER OF TASTE BUDS
- SENSING HEAT AND COLD IS DIMINISHED

NURSING CARE:

- PROTECT FROM INJURY
- FOLLOW SAFETY MEASURES FOR HEAT AND COLD
- PREVENT PRESSURE ULCERS

CIRCULATORY SYSTEM



STRUCTURES INCLUDE THE BLOOD, HEART, AND BLOOD VESSELS.

FUNCTIONS OF THE CIRCULATORY SYSTEM

- CARRY FOOD, WATER, OXYGEN, AND OTHER SUBSTANCES TO THE CELLS.
- COLLECT WASTE PRODUCTS AND CARRY THEM AWAY FROM THE CELLS.
- HELP REGULATE BODY TEMPERATURE.
- PROTECT THE BODY AGAINST DISEASE.
- MAINTAIN FLUID BALANCE.

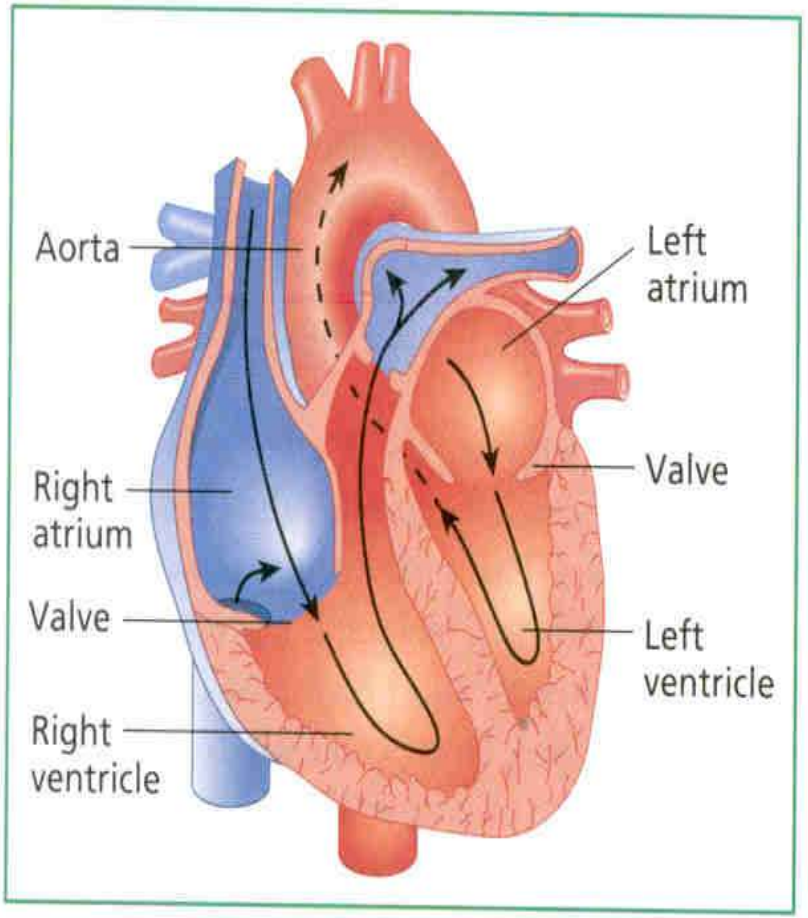
STRUCTURES

BLOOD

- THE FLUID THAT CARRIES OXYGEN, FOOD, WASTE PRODUCTS AND OTHER SUBSTANCES THROUGHOUT THE BODY.
- RED BLOOD CELLS CARRY OXYGEN TO THE CELLS AND GIVE BLOOD ITS RED COLOR.
- WHITE BLOOD CELLS HELP PROTECT THE BODY FROM INFECTION AND ARE A PART OF THE BODY'S IMMUNE SYSTEM.
- PLATELETS HELP THE BLOOD TO CLOT.
- PLASMA IS THE LIQUID PART OF THE BLOOD.

HEART

- THE HEART IS A MUSCLE
- THE HEART IS DIVIDED INTO FOUR CHAMBERS
- THE TWO UPPER CHAMBERS, THE ATRIA, RECEIVE BLOOD COMING INTO THE HEART.
- THE TWO LOWER CHAMBERS, THE VENTRICLES, PUMP BLOOD OUT OF THE HEART TO OTHER PARTS OF THE BODY.



STRUCTURES

BLOOD VESSELS

- ARTERIES CARRY BLOOD AWAY FROM THE HEART.

ARTERIAL BLOOD IS RICH IN OXYGEN

- VEINS RETURN BLOOD TO THE HEART.

VENOUS BLOOD CARRIES LITTLE OXYGEN AND A LOT OF CARBON DIOXIDE

- CAPILLARIES ARE TINY VESSELS THAT CONNECT THE ARTERIES AND VEINS.

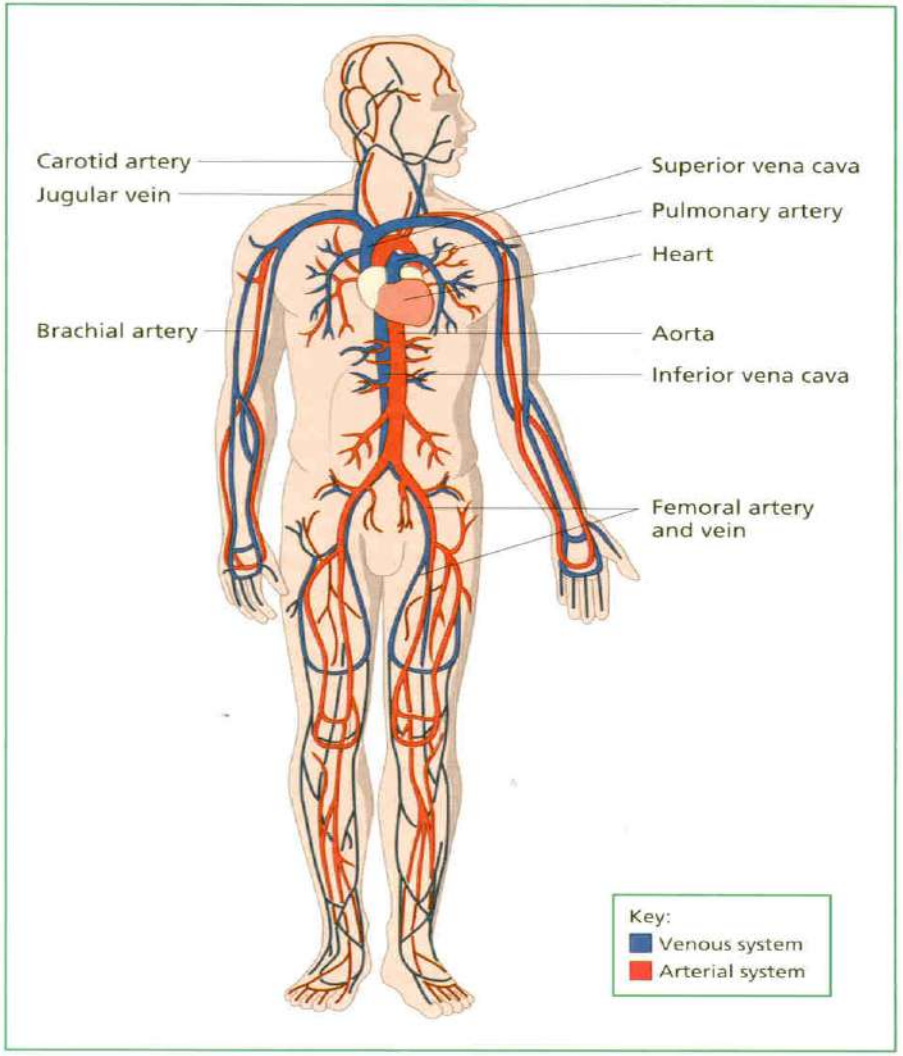


Figure 10-4. The circulatory system transports blood throughout the body.

CHANGES OF AGING

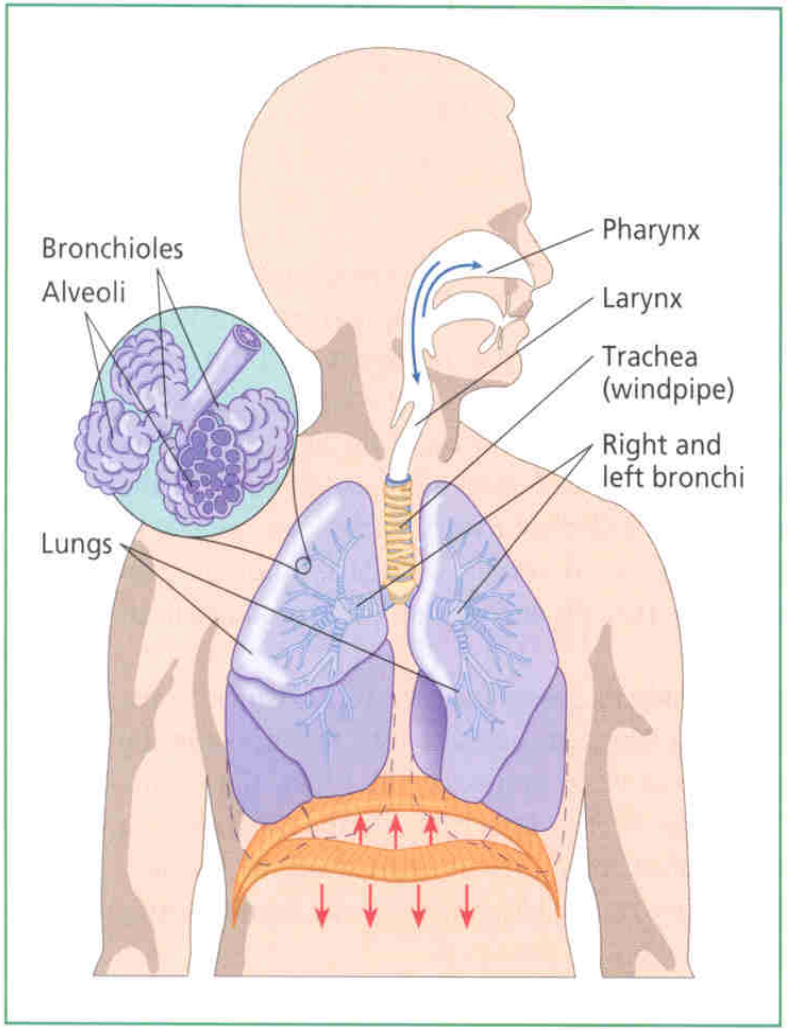
- THE HEART MUSCLE WEAKENS, CAUSING THE HEART TO PUMP WITH LESS FORCE.
- BLOOD VESSELS LOSE THEIR ABILITY TO STRETCH AND BECOME HARD AND NARROW.
- FATTY DEPOSITS CLOG THE NARROWED VESSELS.
- BLOOD PRESSURE RISES.
- THE SLOWING OF CIRCULATION CAUSES PROBLEMS IN OTHER SYSTEMS OF THE BODY.

NURSING CARE: CIRCULATORY SYSTEM

- ALLOW FOR REST PERIODS
- PROTECT FROM INJURY
- MAINTAIN ACTIVITY LIMITS

RESPIRATORY SYSTEM

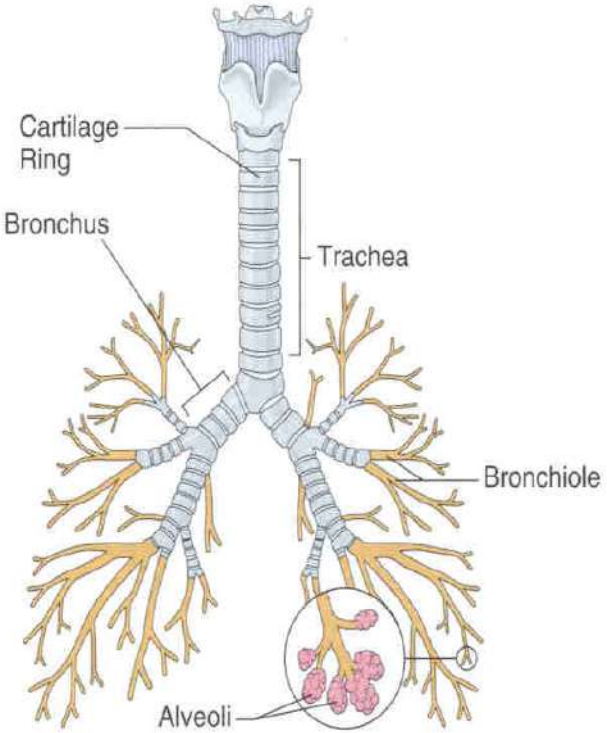
- RESPIRATION IS THE PROCESS OF SUPPLYING THE CELLS WITH OXYGEN AND REMOVING CARBON DIOXIDE
- STRUCTURES INCLUDE THE NOSE, PHARNYX, LARYNX, TRACHEA, BRONCHI, LUNGS, AND ALVEOLI
- THE EPIGLOTTIS PROTECTS THE OPENING TO THE TRACHEA



FUNCTIONS OF THE RESPIRATORY SYSTEM

- BRING OXYGEN INTO THE BODY
- REMOVE CARBON DIOXIDE FROM THE BODY
- ALLOWS COMMUNICATION THROUGH SPEAKING AND MAKING OTHER SOUNDS

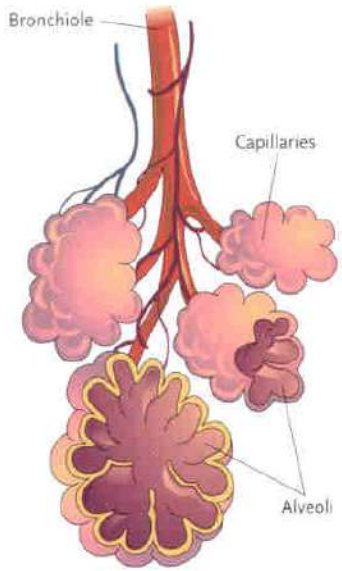
STRUCTURES



THE TRACHEA DIVIDES INTO THE LEFT AND RIGHT BRONCHI.

EACH LUNG HAS ITS OWN BRONCHI

BRONCHI BECOME SMALLER CALLED BRONCHIOLES



BRONCHIOLES LEAD TO SMALL AIR SACS CALLED ALVEOLI

BLOOD VESSELS IN THE ALVEOLI EXCHANGE OXYGEN FOR CARBON DIOXIDE

CHANGES OF AGING

- THE RESPIRATORY SYSTEM IS AFFECTED BY THE SLOWING OF BLOOD CIRCULATION AND THE WEAKENING OF MUSCLES.
- THE LUNG TISSUE LOSES IT'S ELASTICITY.
- THE RIB CAGE BECOMES MORE RIGID. THIS CAUSES LESS EXPANSION OF THE LUNGS.
- THE RESULT OF THESE CHANGES IN THE BODY IS A DECREASE IN THE EXCHANGE OF OXYGEN AND CARBON DIOXIDE.
- THIS DECREASE CAN AFFECT ALL THE OTHER BODY SYSTEMS.

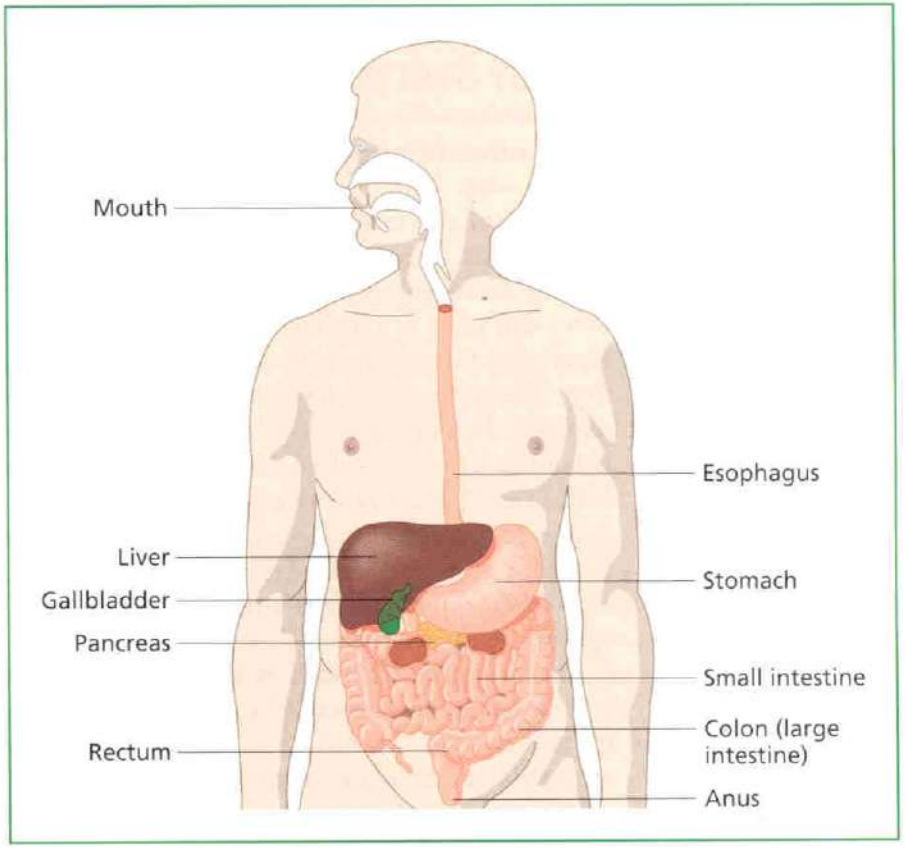
NURSING CARE:

- POSITION FOR EASIER BREATHING
- ASSIST WITH SECRETIONS
- ASSIST WITH DEEP BREATHING
- ENCOURAGE ACTIVITY BUT ALLOW FOR REST PERIODS

THE DIGESTIVE SYSTEM

- BREAKS DOWN FOOD PHYSICALLY AND CHEMICALLY SO IT CAN BE ABSORBED FOR USE BY THE CELLS.

- THE PRIMARY STRUCTURES ARE THE MOUTH, PHARYNX (THROAT) ESOPHAGUS, STOMACH, SMALL INTESTINE, LARGE INTESTINE AND THE LIVER.



FUNCTIONS OF THE DIGESTIVE SYSTEM

- PREPARE FOOD FOR THE BODY'S USE.
- ELIMINATE WASTE PRODUCTS.

STRUCTURES

MOUTH

- SALIVARY GLANDS SECRETE DIGESTIVE JUICES THAT BEGIN THE BREAKDOWN OF THE FOOD.
- TEETH MECHANICALLY BREAK UP THE FOOD INTO SMALLER PIECES.

PHARYNX

- MUSCULAR ACTION OF THE TONGUE MOVES FOOD TO THE BACK OF THE PHARYNX WHERE THE SWALLOWING REFLEX IS LOCATED.

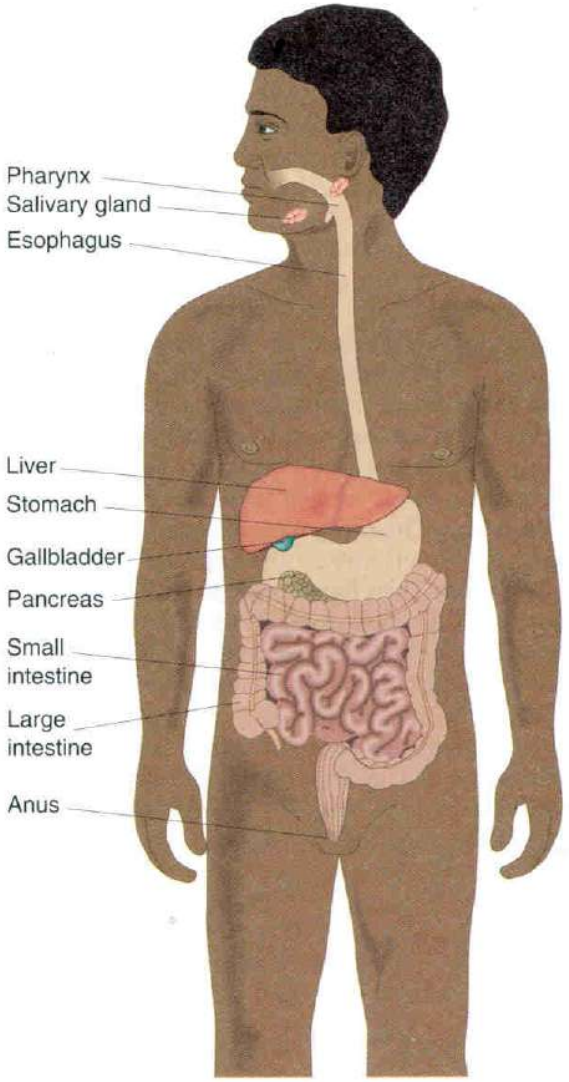


FIGURE 13–11 The Digestive System

STRUCTURES

ESOPHAGUS

- TUBE THAT IS 10 TO 12 INCHES LONG THAT CARRIES THE FOOD TO THE STOMACH.
- STRONG MUSCULAR WAVES OF CONTRACTIONS CALLED *PERISTALSIS* MOVE THE FOOD ALONG THE TRACT.
- PERISTALSIS CONTINUES THROUGH THE ENTIRE DIGESTIVE TRACT.

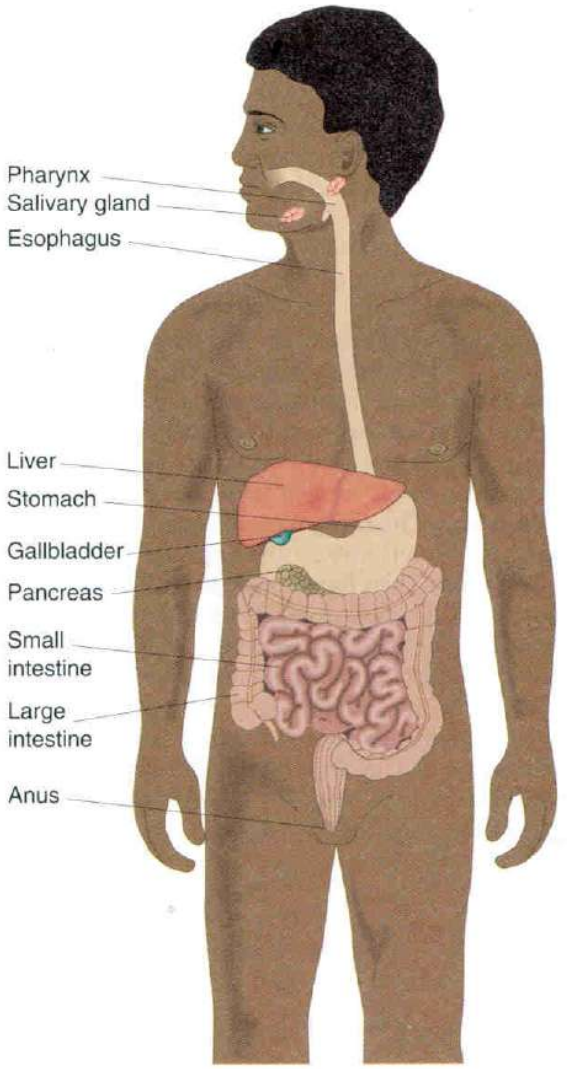


FIGURE 13–11 The Digestive System

STRUCTURES

STOMACH

- HOLLOW, MUSCULAR , J - SHAPED ORGAN.
- SECRETES DIGESTIVE JUICES TO BREAKDOWN THE FOOD.
- MIXES AND CHURNS THE FOOD.
- HOLDS THE FOOD BETWEEN 3 – 4 HOURS.

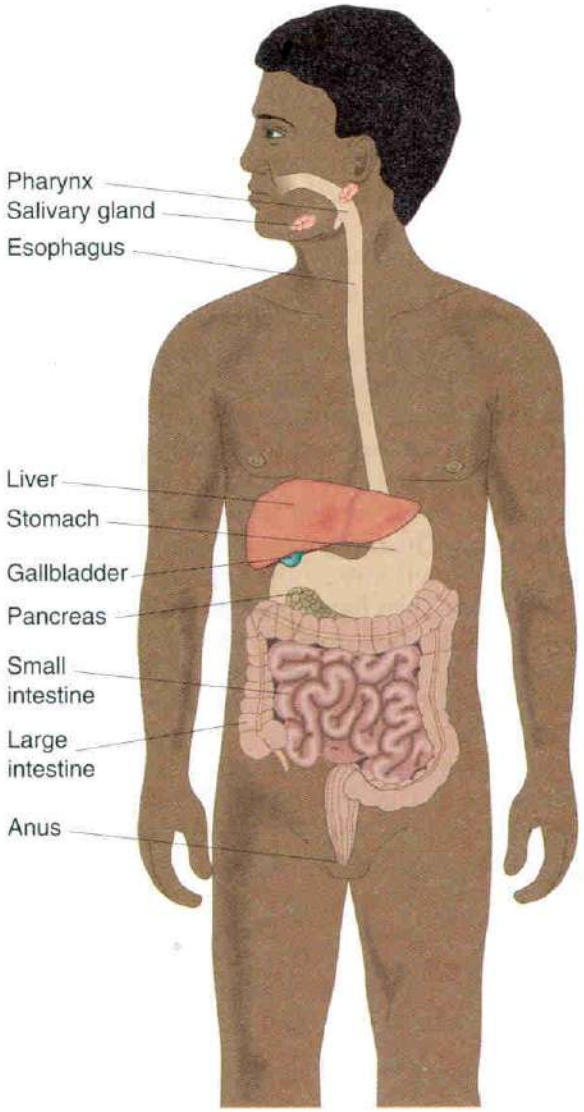


FIGURE 13–11 The Digestive System

STRUCTURES

SMALL INTESTINE

- ABOUT 20 FEET LONG
- BILE AND OTHER DIGESTIVE JUICES FROM THE GALLBLADDER, LIVER, AND PANCREAS ARE ADDED.
- FOOD DIGESTION IS COMPLETED IN THE SMALL INTESTINE.
- FOOD AND NUTRIENTS ARE ABSORBED INTO THE BLOODSTREAM THROUGH THE WALLS OF THE SMALL INTESTINE.

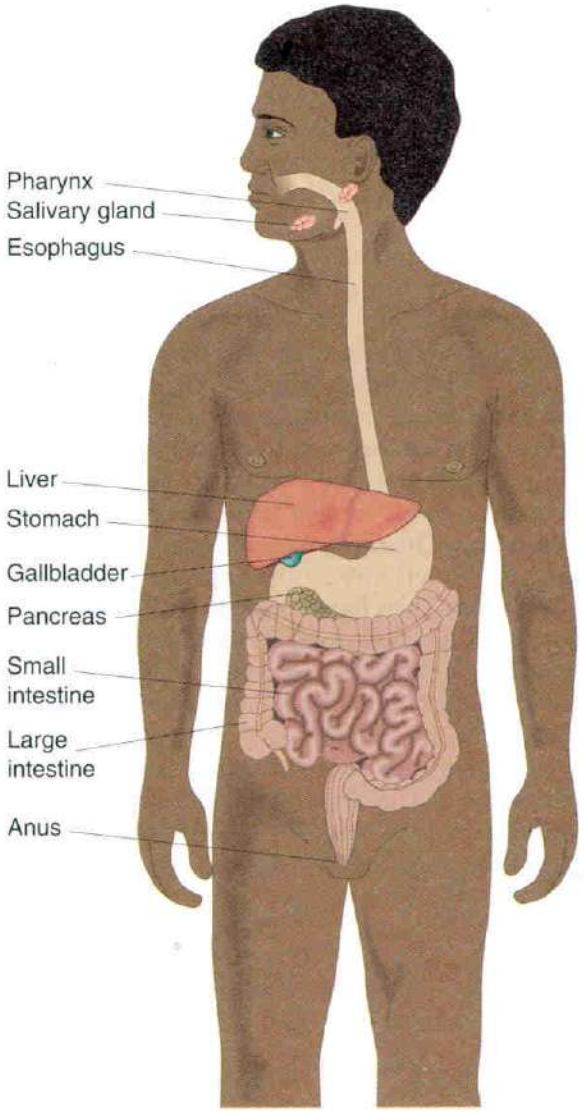


FIGURE 13–11 The Digestive System

STRUCTURES

LARGE INTESTINE

- WATER IS REMOVED FROM THE REMAINING WASTES AND ABSORBED INTO THE BLOODSTREAM.
- THIS CHANGES THE WASTES INTO A MORE SOLID FORM.
- THE MATERIAL THAT REMAINS FORMS A SEMISOLID WASTE PRODUCT CALLED *FECES*.
- FECES ARE STORED IN THE RECTUM UNTIL THEY LEAVE THE BODY THROUGH THE ANUS.

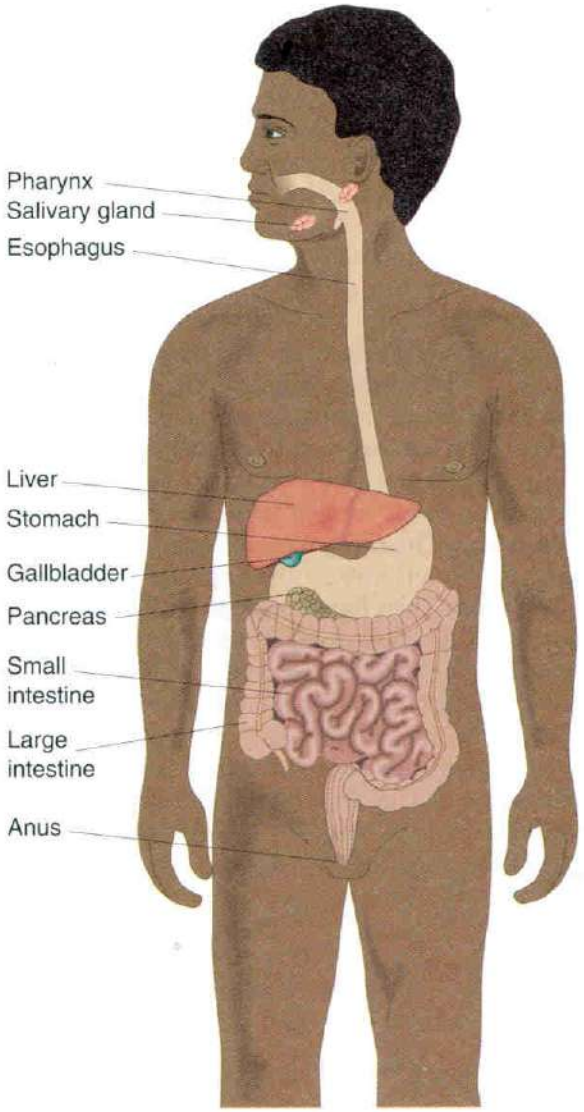


FIGURE 13–11 The Digestive System

STRUCTURES

LIVER

GALLBLADDER

PANCREAS

- THE LIVER PRODUCES BILE WHICH IS USED IN THE DIGESTION OF FATS.
- THE BILE IS STORED IN THE GALLBLADDER.
- THE PANCREAS SECRETES SOME DIGESTIVE ENZYMES.

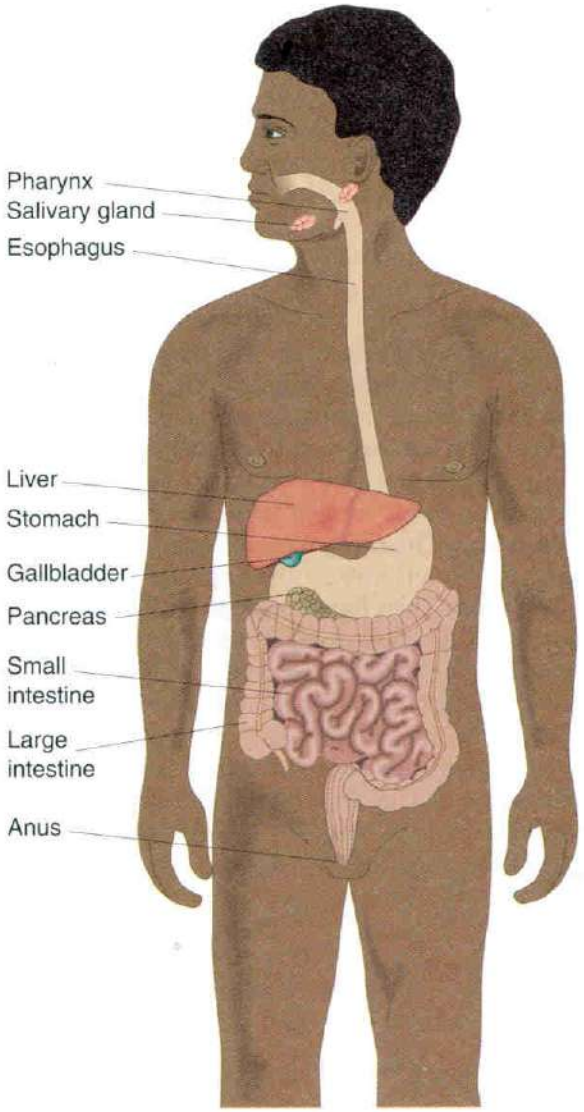


FIGURE 13–11 The Digestive System

CHANGES OF AGING

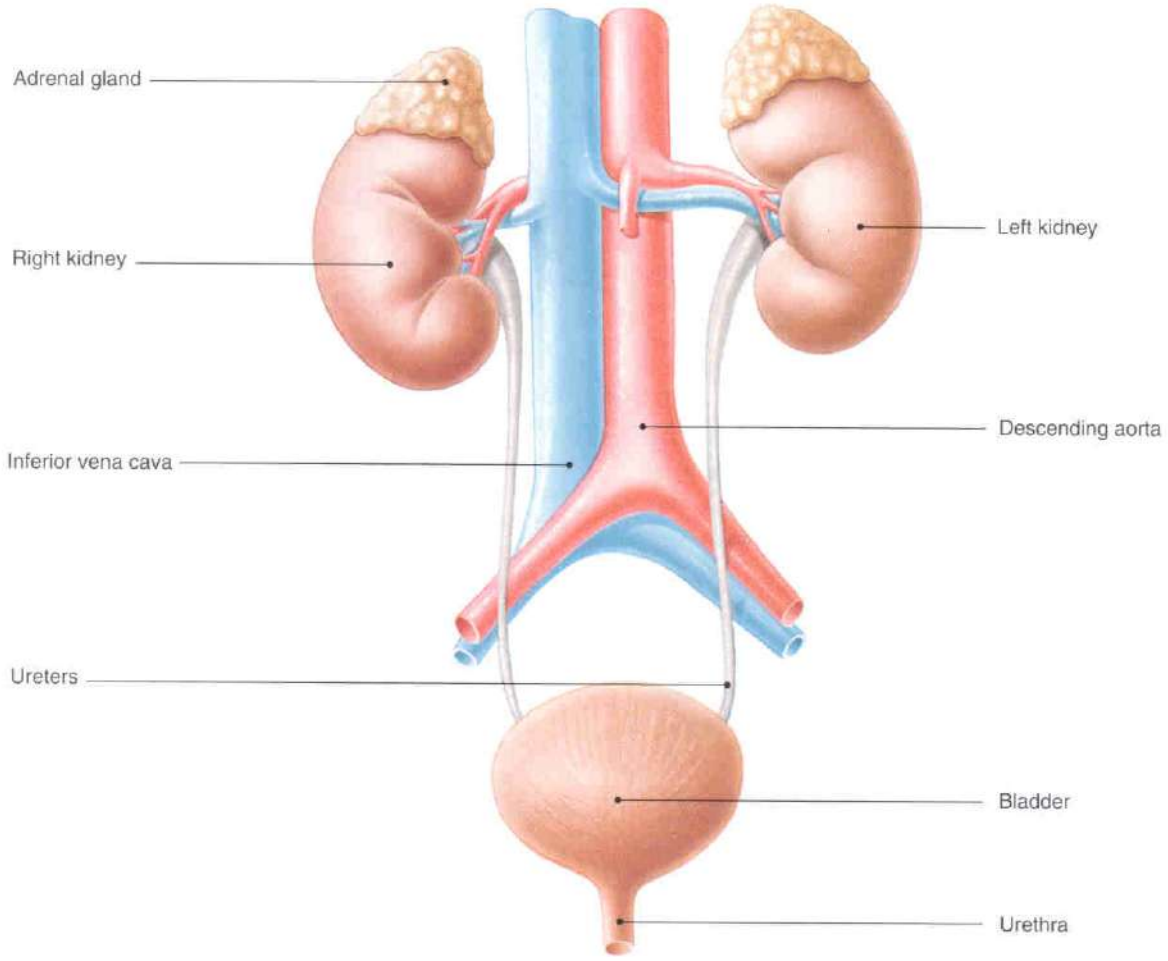
- MUSCLE TONE DECREASES THROUGHOUT THE SYSTEM CAUSING A SLOWING OF PERISTALSIS.
- A DECREASE IN SALIVA AND IN THE NUMBER OF TASTE BUDS CAUSES A DECREASE IN APPETITE.
- CHEWING AND SWALLOWING PROBLEMS MAY DEVELOP.
- A DECREASE IN DIGESTIVE JUICES MAKES FOOD HARDER TO DIGEST.

NURSING CARE: DIGESTIVE SYSTEM

- CHECK FOR SWALLOWING DIFFICULTIES
- ADJUST DIET AS NEEDED
- MONITOR FOR CONSTIPATION

URINARY SYSTEM

PRIMARY STRUCTURES ARE THE KIDNEYS, URETERS, BLADDER, URETHRA, AND URINARY MEATUS



FUNCTIONS OF THE URINARY SYSTEM

- REMOVES WASTES FROM THE BLOOD STREAM.
- ELIMINATES WASTE PRODUCTS THROUGH URINE.
- HELPS MAINTAIN THE BODY'S WATER AND CHEMICAL BALANCE.

STRUCTURES

KIDNEYS

- TWO BEAN SHAPED ORGANS
- THE CELLS OF THE KIDNEYS (NEPHRONS) FILTER THE BLOOD AS IT PASSES THROUGH, REMOVING WASTE PRODUCTS FROM THE BLOOD.
- THE WASTES AND THE LIQUID THEY ARE DILUTED IN IS CALLED URINE.

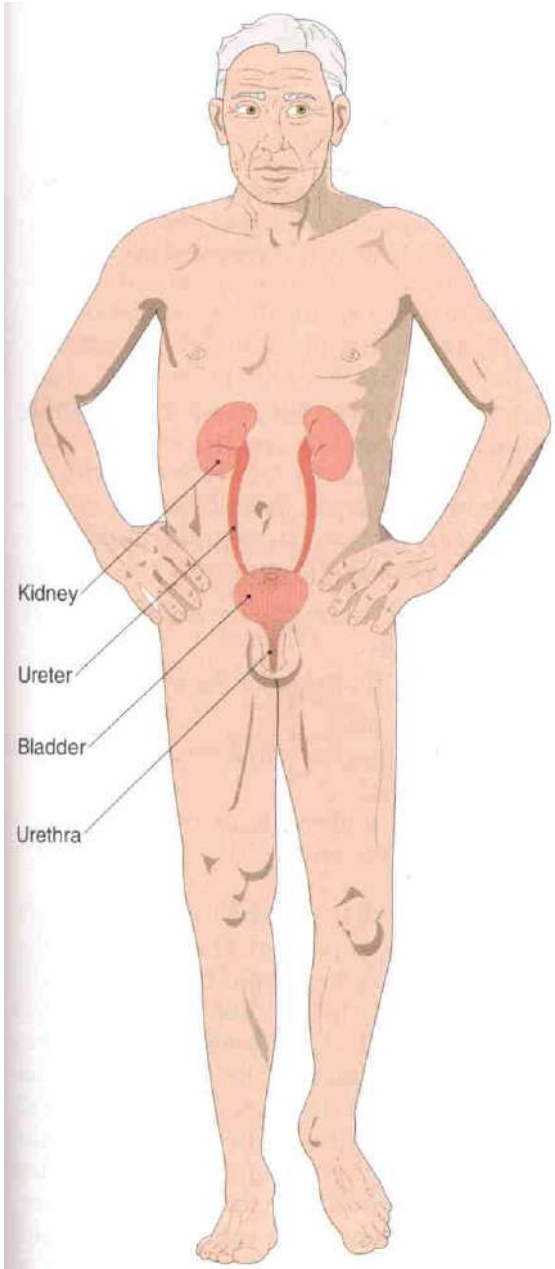


FIGURE 13–12 The Urinary System

STRUCTURES

URETERS

- TUBES THAT CARRY THE URINE FROM THE KIDNEY TO THE BLADDER.
- THERE ARE TWO URETERS – ONE FROM EACH KIDNEY.

BLADDER

- A MUSCULAR EXPANDABLE SAC.
- HOLDS THE URINE UNTIL IT IS EXPELLED.
- THE URGE TO URINATE USUALLY OCCURS WHEN THE BLADDER IS ONE THIRD FULL (200-300 ML.).

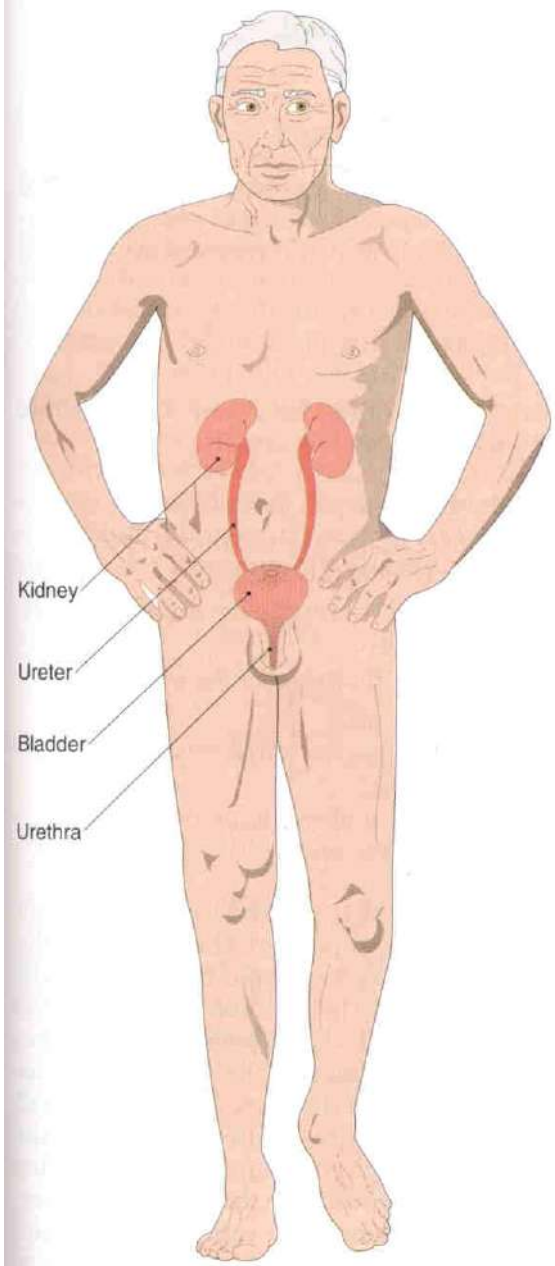


FIGURE 13–12 The Urinary System

STRUCTURES

URETHRA

- A TUBE THAT LEADS FROM THE BLADDER TO THE OUTSIDE OF THE BODY.
- FEMALE URETHRA IS 1-1/2 INCHES LONG.
- MALE URETHRA IS ABOUT 8 INCHES LONG.

URINARY MEATUS

- THE OPENING TO THE OUTSIDE OF THE BODY .
- CONTROLLED BY A SPINCTER MUSCLE

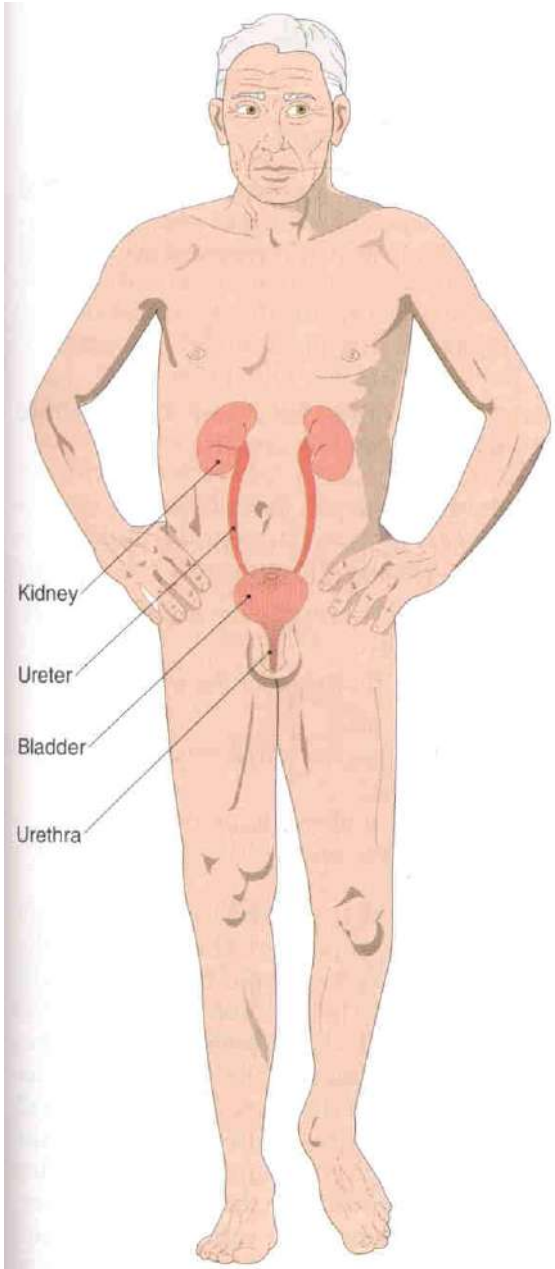


FIGURE 13–12 The Urinary System

CHANGES OF AGING

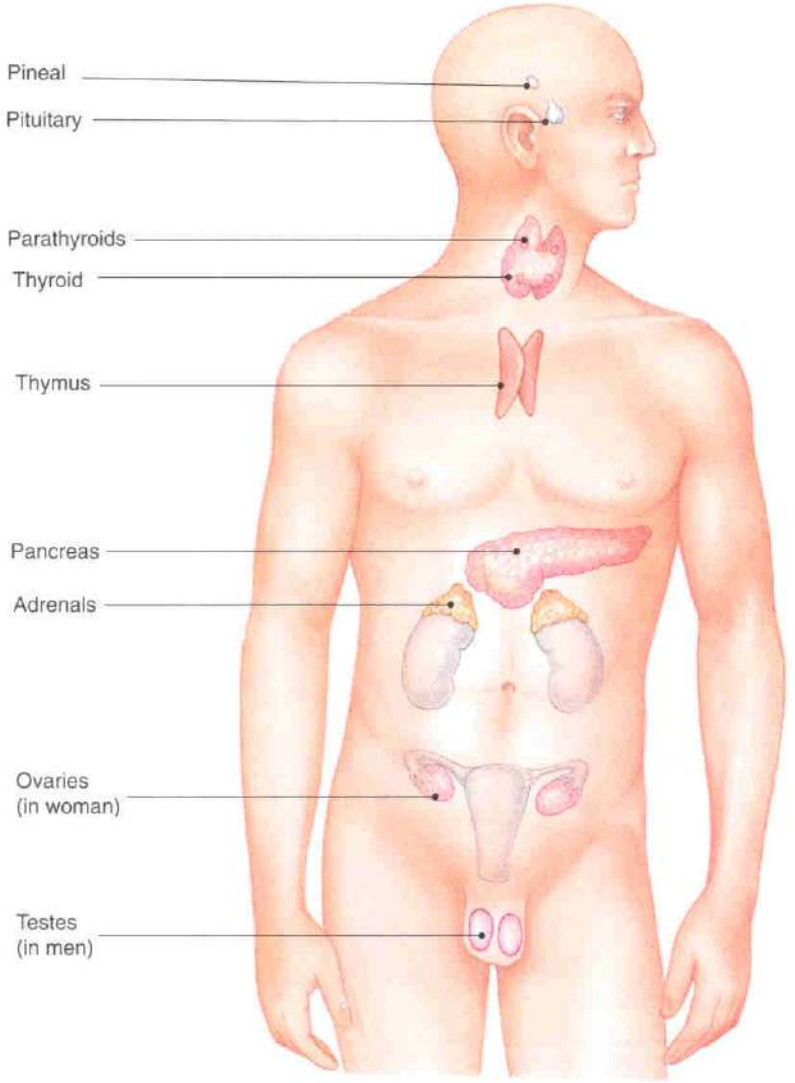
- THE KIDNEYS DO NOT FILTER AS EFFICIENTLY IN THE ELDERLY PERSON (FEWER NEPHRONS AND SLOWER CIRCULATION).
- WASTE PRODUCTS BUILD UP IN THE BLOOD.
- DECREASE IN THE MUSCLE TONE OF THE BLADDER (THE BLADDER HOLDS LESS URINE AND MAY NOT EMPTY COMPLETELY).
- THE SPINCTER MUSCLE WEAKENS AND MAY ALLOW URINE TO ESCAPE INVOLUNTARILY.

NURSING CARE: URINARY SYSTEM

- OBSERVE URINE OUTPUT
- ASSIST WITH INCONTINENCE CARE
- MAINTAIN ADEQUATE FLUID INTAKE

THE ENDOCRINE SYSTEM

- SECRETES CHEMICALS CALLED HORMONES
- SECRETED INTO THE BLOODSTREAM
- HORMONES CONTROL AND REGULATE BODY ORGANS AND GLANDS



STRUCTURES

PITUITARY GLAND

- CALLED THE "MASTER GLAND" BECAUSE IT REGULATES THE FUNCTION OF THE OTHER GLANDS
- LOCATED AT THE BASE OF THE BRAIN

THYROID GLAND

- LOCATED IN THE NECK
- HORMONES SECRETED AFFECT BODY GROWTH AND DEVELOPMENT
- REGULATES METABOLISM

PANCREAS

- LOCATED NEAR THE SMALL INTESTINE
- PRODUCES INSULIN

IMMUNE SYSTEM

- PROTECTS THE BODY FROM DISEASE AND INFECTION
- DEFENDS AGAINST THREATS FROM INSIDE AND OUTSIDE OF THE BODY
- WHEN THE BODY SENSES AN UNWANTED SUBSTANCE THE IMMUNE SYSTEM ACTS