Introduction to Human Anatomy

What is human anatomy?

- Human anatomy is the scientific study of the body’s structures.
  - Gross anatomy studies structures visible with the unaided (naked) eye
  - Microscopic anatomy requires instrumentation to visualize small structures (cytology and histology)
  - Regional anatomy focuses on the interrelationships of structures in a specific body region (knee for example)
  - Systemic anatomy looks as body systems (many courses utilize a systems approach by presenting information by organ systems)

What is physiology?

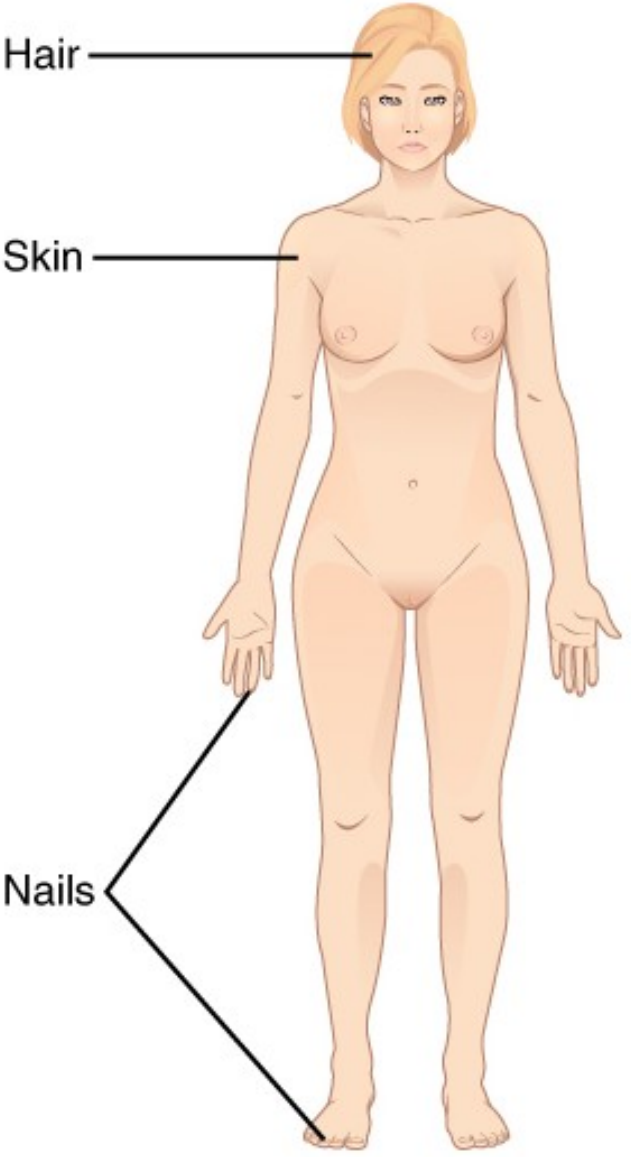
- Human physiology is the scientific study of the chemical and physical processes of the body and the ways they work together to support the functions of life
- However, anatomy will sometimes stray into physiology and vice versa
- Functional morphology is common used when learning anatomy as it addresses the basic function of structures

Organ Systems

- Anatomy is generally divided into 12 logical divisions known as “organ systems”
- While the division is needed for logical presentation, the systems are interdependent and one can only survive with all systems functioning as an integrated whole
- Organ systems include the integumentary, skeletal, muscular nervous, endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, male reproductive and female reproductive systems (some texts may combine male and female reproductive systems)

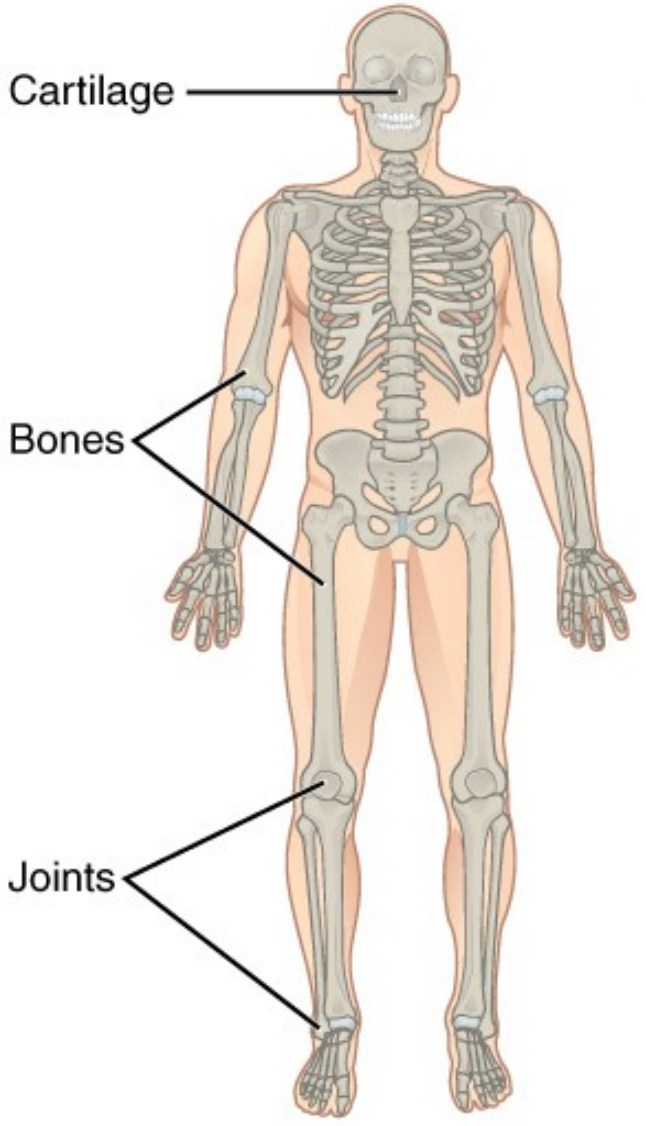
Integumentary System

- Includes hair, skin, and nails
- Functions to enclose the internal body structures
- Barrier to the entry of foreign substances and particles (passive immunity)
- Involved in regulation of body temperature (sweating)
- Site of many sensory receptors and glands



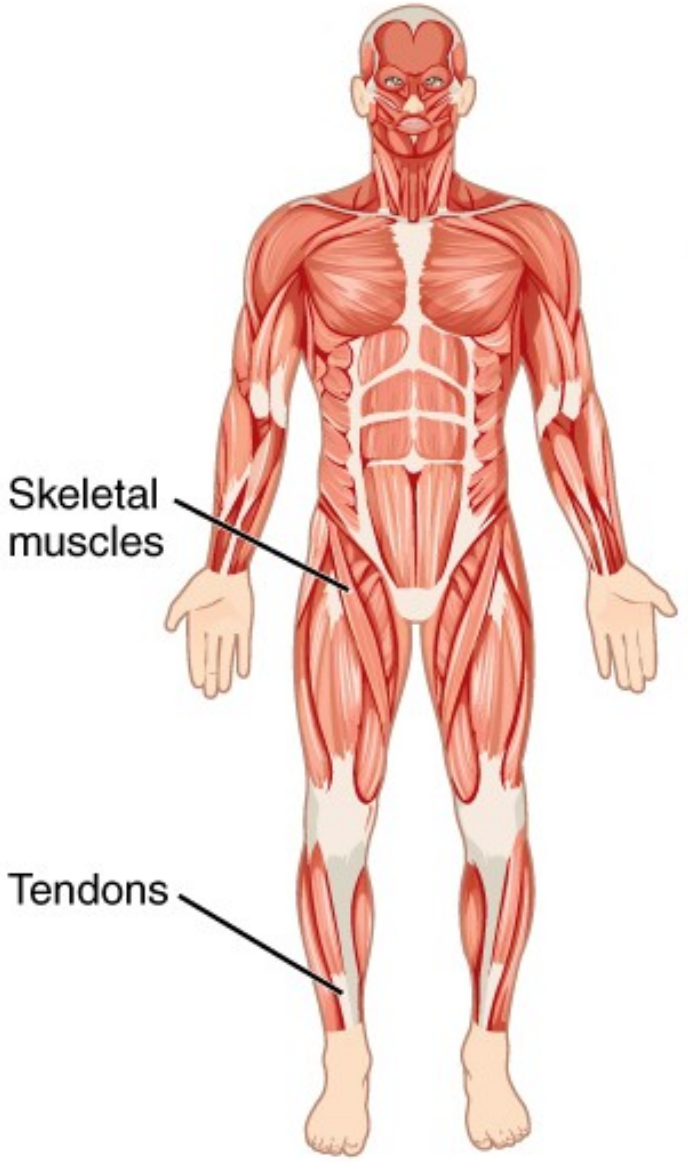
Skeletal System

- Includes cartilage, bones, ligaments and joints
- Functions to support the body, enables movement, and protects internal organs
- Site for production of blood cells



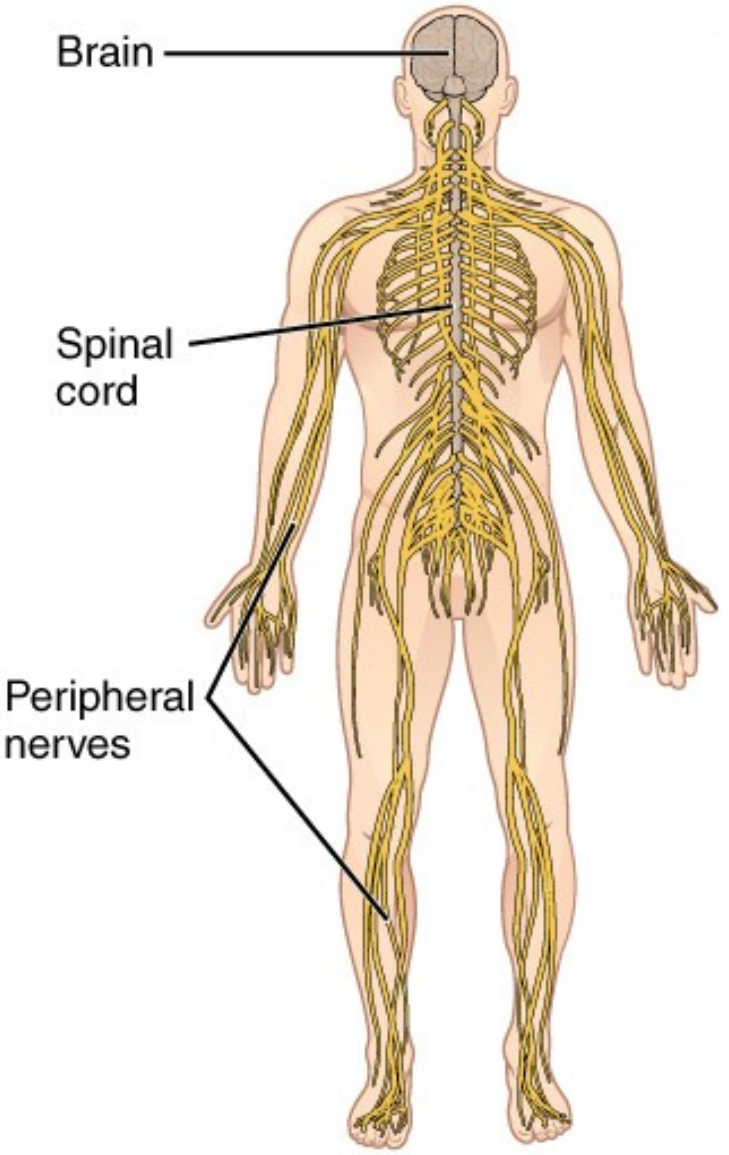
Muscular System

- Includes skeletal muscles and tendons
- Functions to enable body movement
- Helps to maintain body temperature by generating heat (muscle tone and shivering)



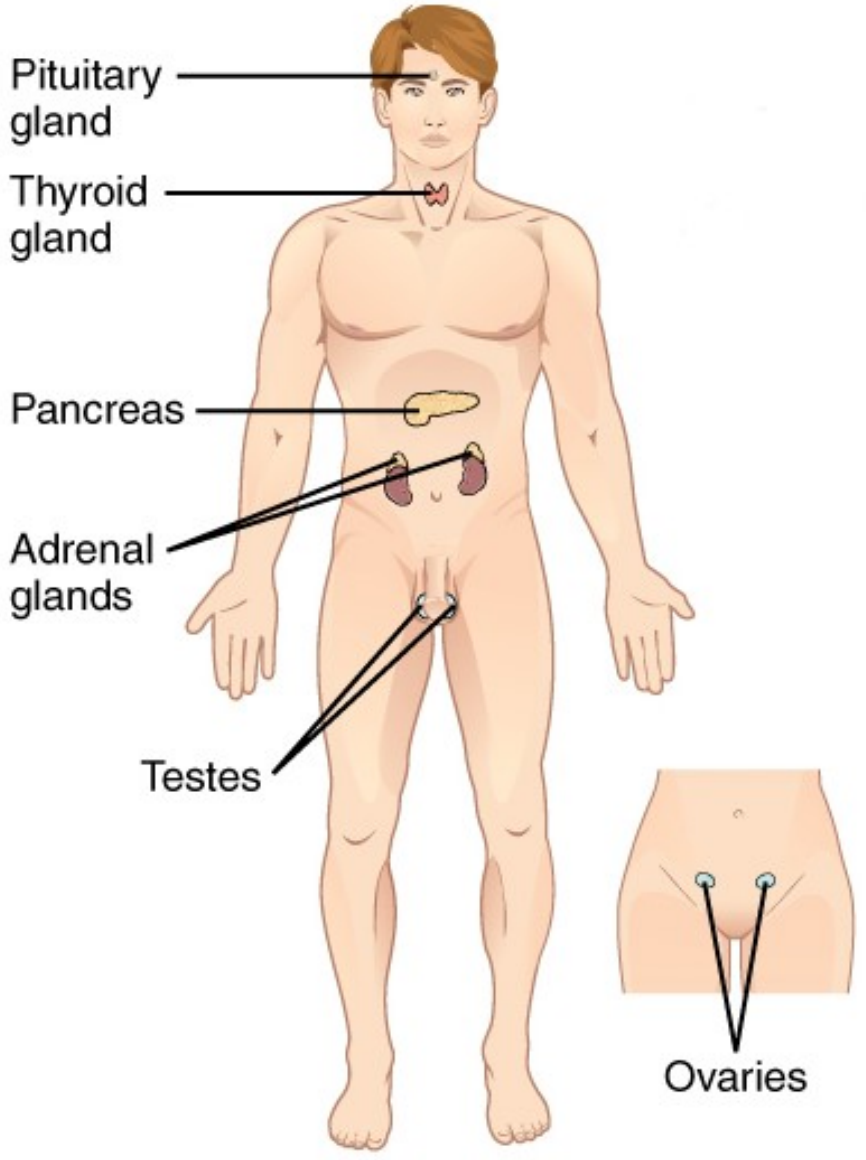
Nervous System

- Includes brain, spinal cord, and peripheral nerves
- Functions to detect and process sensory information, to control movement of skeletal muscles, and to activate body responses



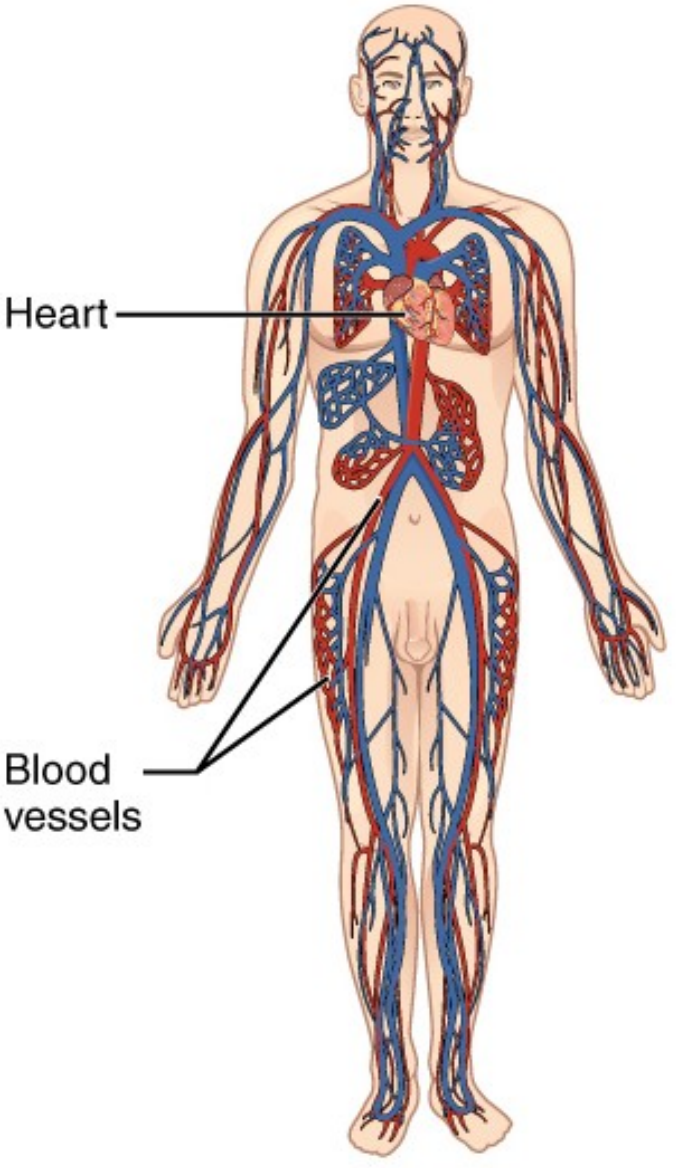
Endocrine System

- Includes pituitary gland, thyroid gland, pancreas, adrenal glands, testes (males), and ovaries (females)
- Functions include secretion of hormones and regulation of body processes



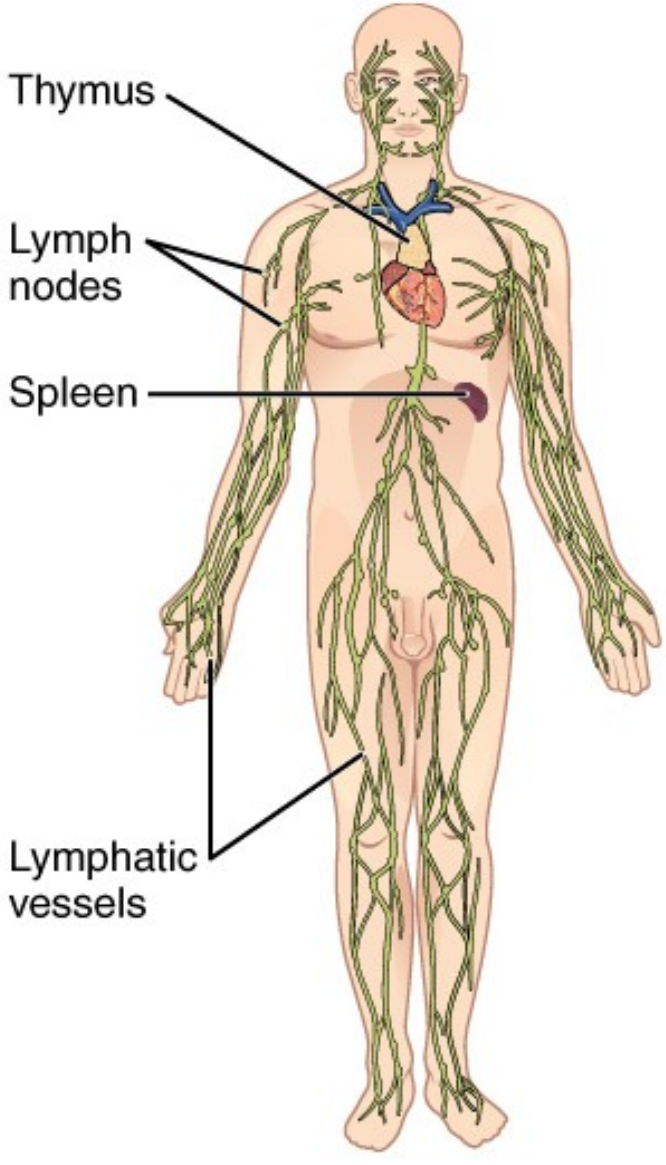
Cardiovascular System

- Includes the heart and blood vessels
- Functions to deliver oxygen and nutrients to tissues and equalizes body temperature
- Transports hormones to site of action
- Transports wastes to organ responsible for excretion
- Note that this is the third organ system playing a role in body temperature … systems are truly **interdependent**



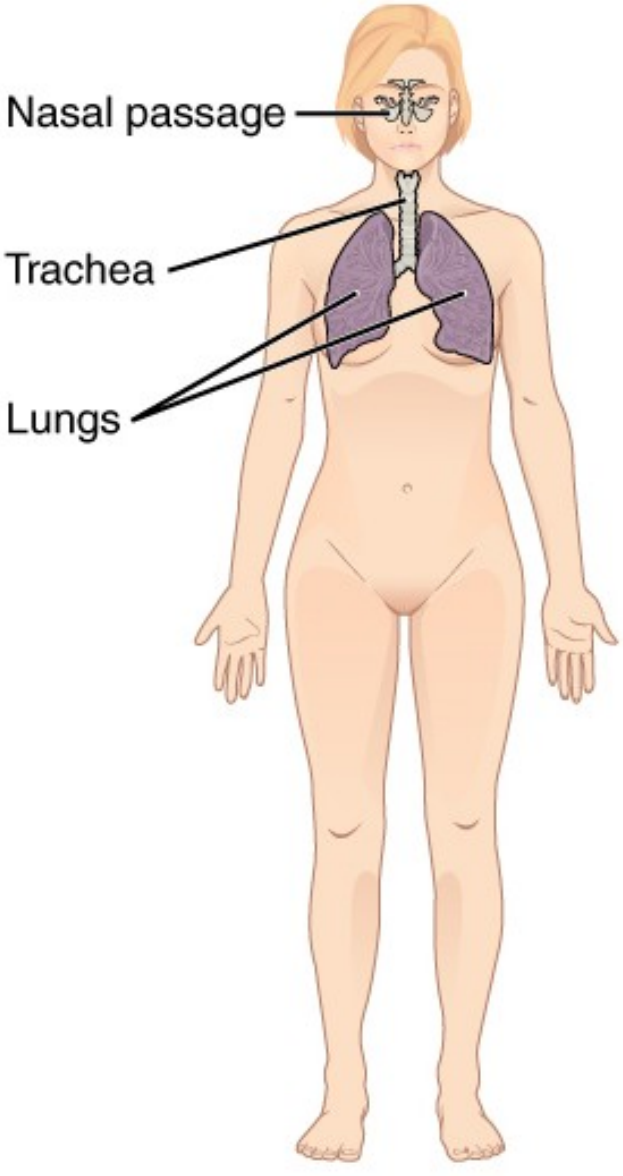
Lymphatic System

- Includes the thymus, lymph nodes, spleen and lymphatic vessels
- Functions to remove accumulated fluid from tissues and return the fluid to the blood
- Defends against pathogens (contains major components of the immune system, *which is not an organ system*)



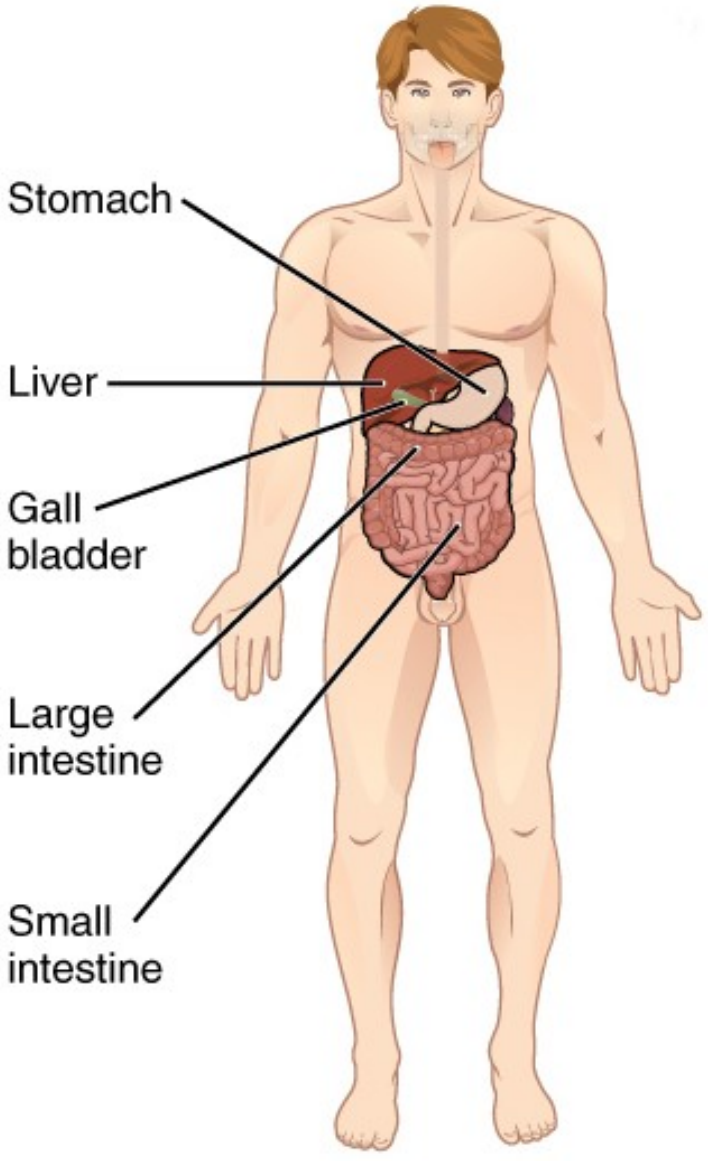
Respiratory System

- Includes nasal passage, trachea, and lungs
- Functions in the exchange of gases between the atmosphere and blood (removes carbon dioxide and absorbs oxygen)
- Important for vocalization
- Responsible for rapid adjustment of body’s pH



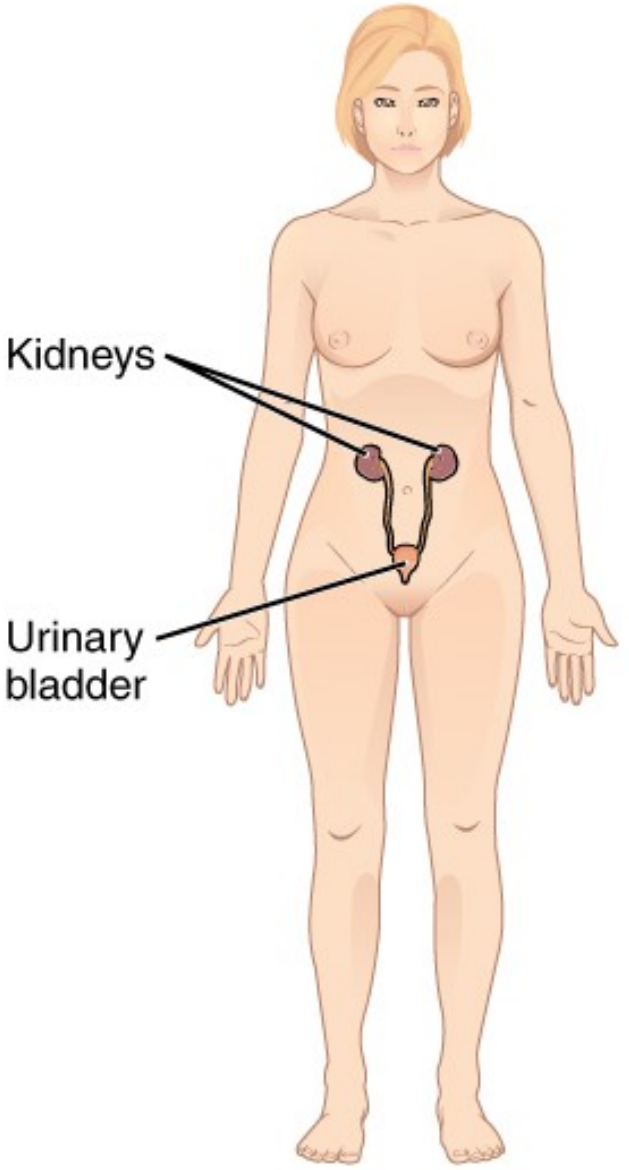
Digestive System

- Includes stomach, liver, gall bladder, large intestine, and small intestine
- Functions to process food for absorption of nutrients, and removes undigested wastes



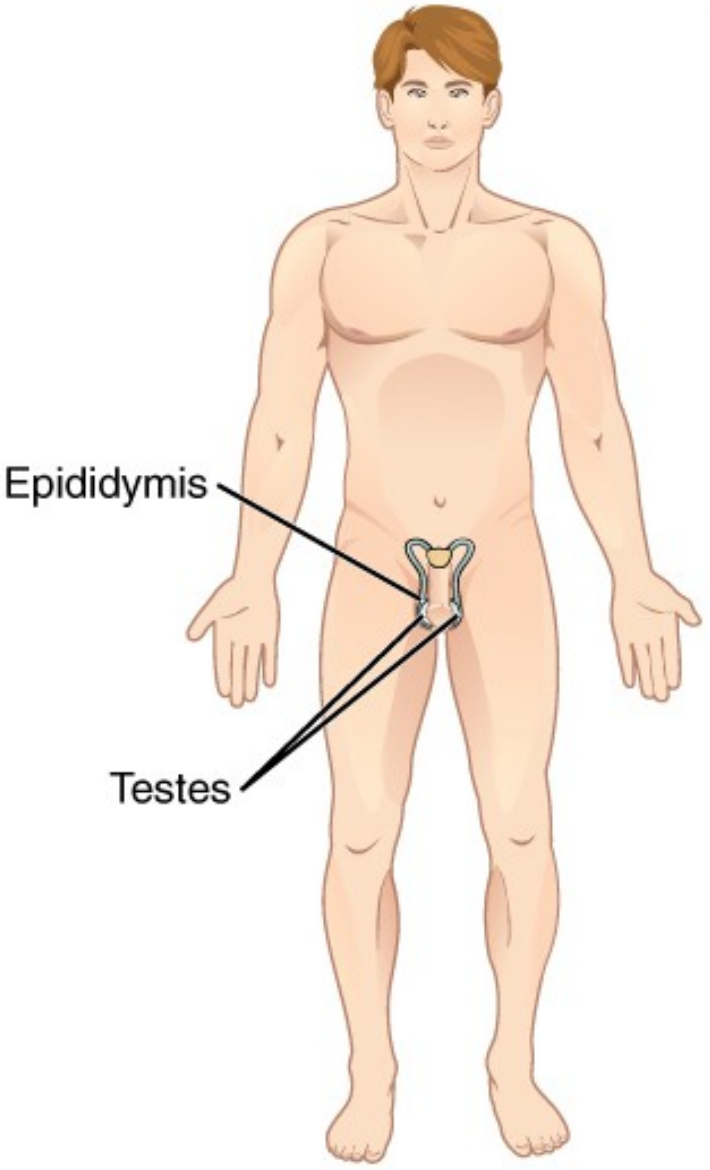
Urinary System

- Includes the kidneys and urinary bladder
- Functions to regulate whole body water content, removes and excretes wastes from blood, important for long-term pH control
- Regulates production of red blood cells (some organs play a role in multiple organ systems, urinary and endocrine in this case)



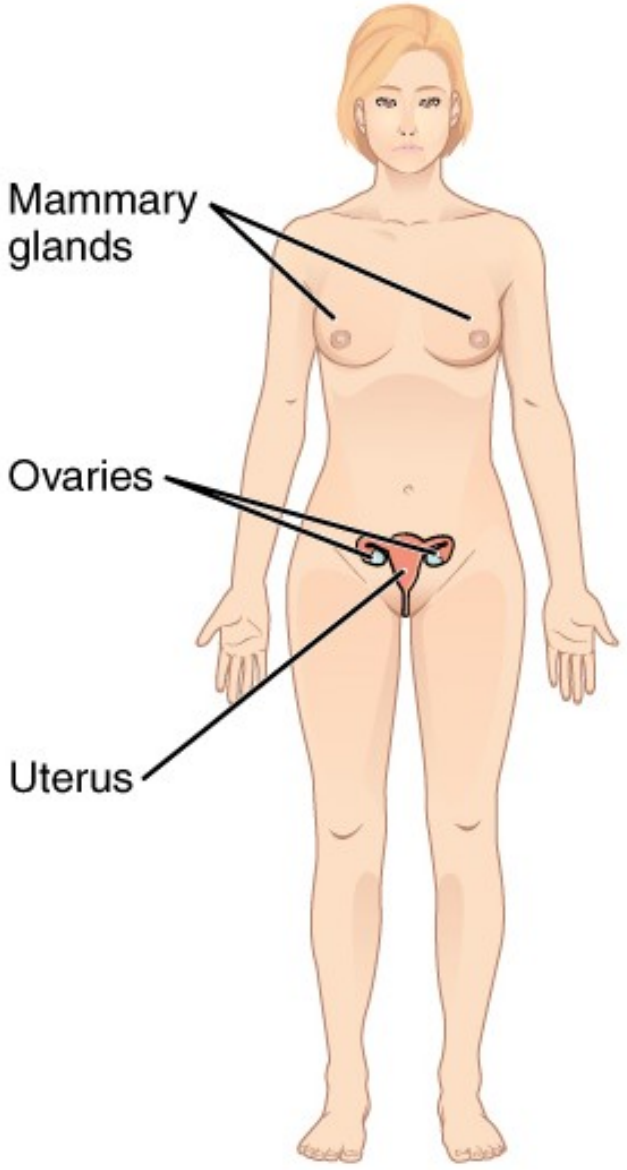
Male Reproductive System

- Includes testes and epididymis
- Functions in the production of sex hormones (endocrine functions)
- Delivers gametes (sperm) to the female



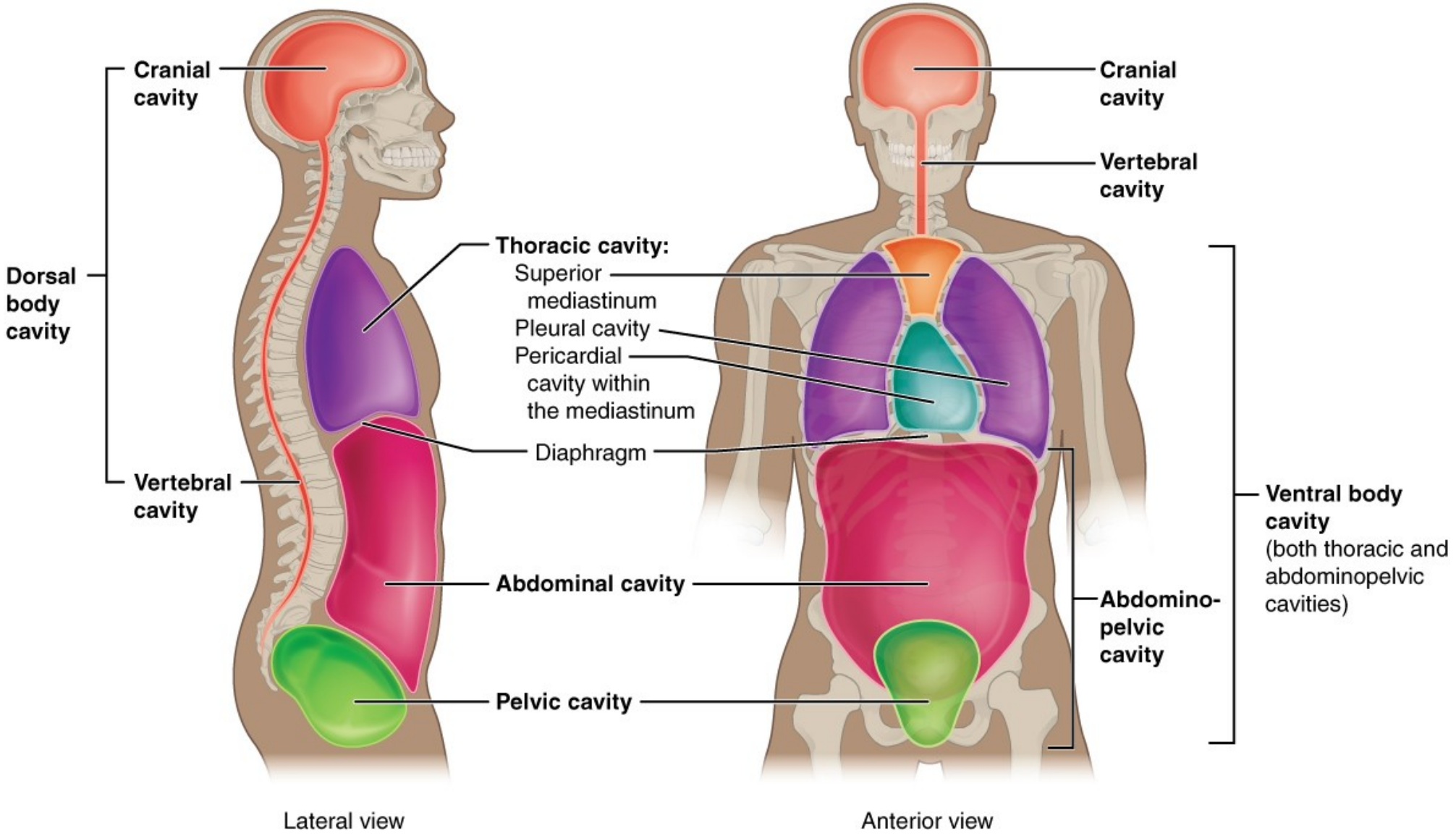
Female Reproductive System

- Includes mammary glands, ovaries, and uterus
- Functions in the production of sex hormones, supports growth of embryo and fetus, produces milk for the infant



Location of Organs

- most major organs are located in membrane lined body cavities (an exception is the kidney which is retroperitoneal … behind the peritoneum)
- body cavities can broadly be divided into dorsal and ventral (developmentally from neural tube and early gut)
- the dorsal body cavity consists of the cranial and vertebral cavities, which are actually a single continuous cavity
- the ventral body cavity consists of the thoracic, pericardial, abdominal and pelvic cavities (abdominopelvic cavity is definitely a single cavity)
- body cavities are lined with a serous membrane (endothelial tissue layer that surrounds the cavity and organs which secretes a serum-like fluid for moisture and lubrication)


Cranial cavity
Dorsal body cavity
Vertebral cavity
Thoracic cavity:
Superior mediastinum
Pleural cavity
Pericardial cavity within the mediastinum
Diaphragm
Abdominal cavity
Pelvic cavity
Lateral view
Cranial cavity
Vertebral cavity
Abdomino-pelvic cavity
Ventral body cavity (both thoracic and abdominopelvic cavities)
Anterior view

Mediastinoscopy

- Examination of the mediastinum using a lighted instrument (mediastinoscope, similar to an endoscope)
- The mediastinum is a region behind the sternum and between the lungs which contains the heart, trachea, esophagus, thymus and some lymph nodes
- Can be used for diagnosis and staging of diseases (cancer) of the thoracic cavity by inspection and collection of tissue samples (biopsy)
- Procedure is performed under general anesthesia with a small incision made in the neck immediately superior to the sternum followed by insertion of the scope
- Typically low risk, but bleeding, pneumothorax (puncture of pleura, collapsed lung) and infection are potential complications

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References

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