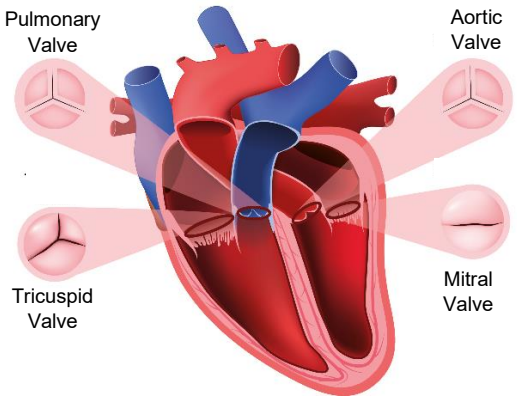
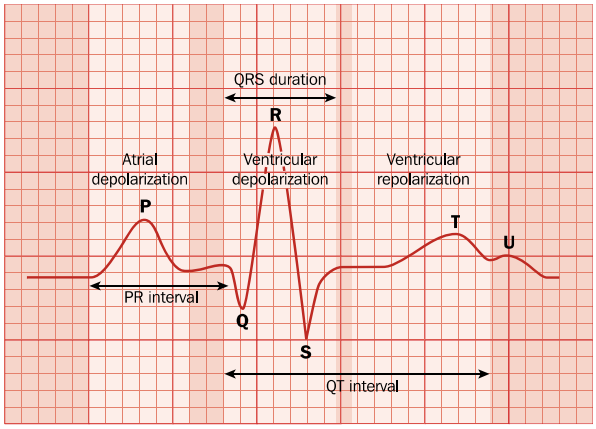
TOPIC: WHAT IS ANATOMY AND PHYSIOLOGY?

- Anatomy & Physiology: study of body's structure and function.
  - **Anatomy:** the study of the body's _____.
  - **Physiology:** the study of the body's _____.

_____ of the heart.



_____ of the heart.



EXAMPLE: Mark the following statements with an "**A**" if you think it relates to anatomy and a "**P**" if you think it relates more to physiology.

_____ The hormone insulin is released when blood glucose levels increase.

_____ Two major blood vessels enter the liver, the hepatic portal vein, and the hepatic artery.

_____ Electric charge in neurons is maintained through a gradient of ions across the cell membrane.

_____ Ligaments and tendons are largely composed of collagen fibers.

_____ There are 206 named bones in the human body.

_____ Activation of the sympathetic nervous system will increase heart rate and elevate blood pressure.

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EXAMPLE: Two biologists are studying the causes of acid reflux (heartburn). Determine whether each biologist takes a more anatomical approach to their study or a more physiological approach.

a) Rita uses a probe to measure the change in pH of subjects' stomach acid before and after eating and compares that data to the amount of heartburn the subject reports experiencing.

_____

b) Andre uses MRI data to compare the shape of the stomach, pyloric sphincter, and esophagus, for 100 subjects who complain of regular heartburn and 100 subjects who do not experience heartburn.

_____

PRACTICE: People who lift weights or participate in similar resistance exercise will typically have bones that are thicker and even restructured internally compared to people who do not lift weights. This increased thickness and restructuring results in stronger bones. As described here, is the difference between people who lift weights and those who don't a difference in anatomy or a difference in physiology?

a) Anatomy.
b) Physiology.
c) Neither anatomy nor physiology.
d) Equally both anatomy and physiology.

PRACTICE: Which describes an activity that would most likely be performed by someone that considers themselves a physiologist?

a) Perform a detailed dissection of a cadaver's calf muscles to identify the layers of muscle and connective tissue.
b) Grow liver cells in cell culture to measure how quickly they metabolize alcohol in different conditions.
c) Weigh the brains of many individuals to test for a correlation to body size.
d) Map the ducts of different glands and mathematically analyze if the branching patterns are optimally connected.

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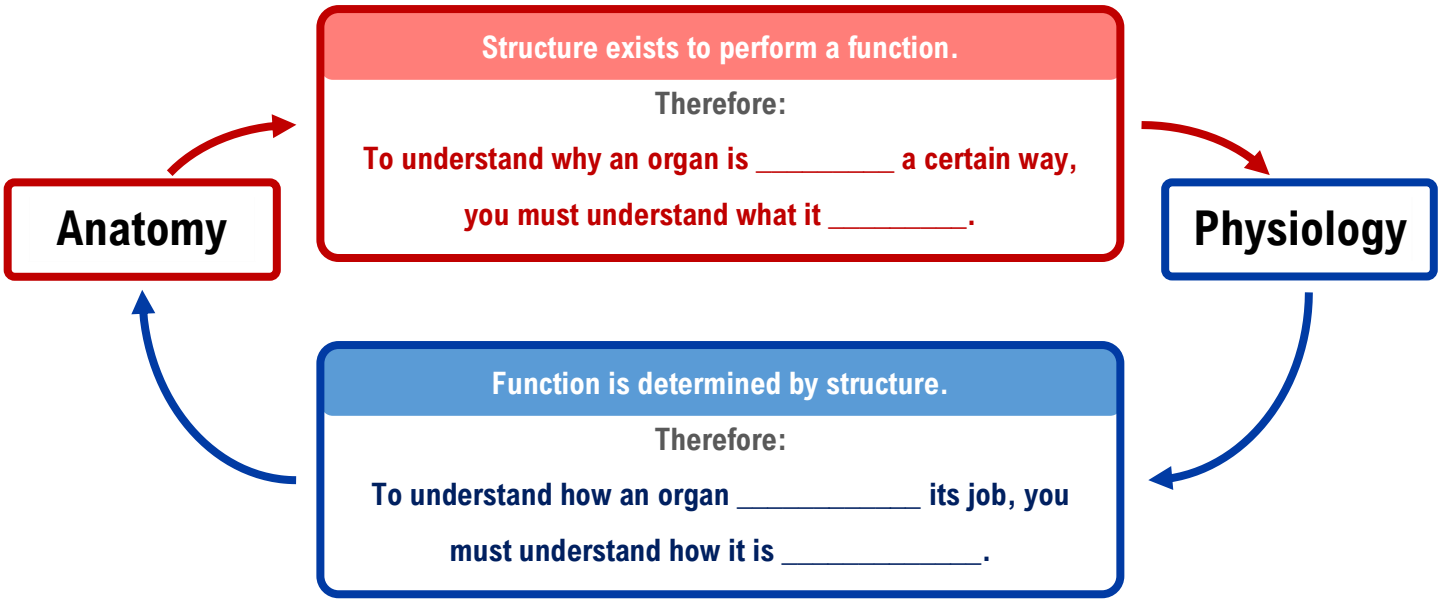
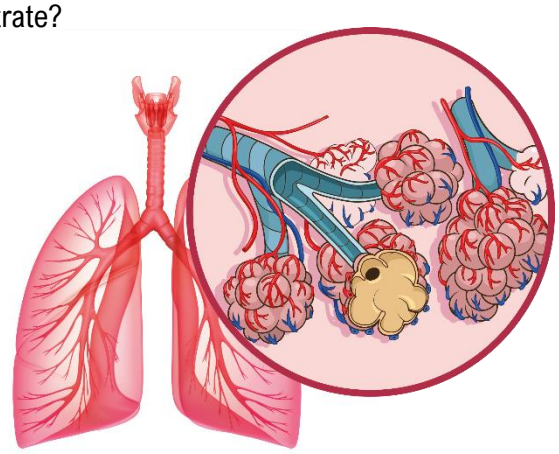
Anatomy & Physiology Are Closely Related

- Anatomy & Physiology are not completely _____
  - Principle of complementarity



EXAMPLE: What relationship does the following information illustrate?

- Structure of lungs:
  - Network of passageways deliver air.
  - Alveoli increase surface area.
  - Extremely thin walls.
  - Many small capillaries deliver blood.
- Function of lungs:
  - Exchange of O_2 and CO_2 between the air a



Relationship: _____

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PRACTICE: Which example best describes the close relationship between anatomy and physiology?

a) The kidneys will remove more water from the blood as blood volume increases.
b) The size of the heart can vary as a function of sex, height, weight, age, and other factors.
c) The study of anatomy & physiology spans many levels of organization from the molecular to the whole body.
d) The structure of the heart valves causes the blood to flow in only one direction when the heart pumps.

PRACTICE: Why is it important to have some knowledge of anatomy in order to study physiology?

a) It is important because structures (anatomy) can change rapidly depending on the function (physiology) that must be performed.
b) It is important because how something functions (physiology) is directly dependent on its structure (anatomy).
c) It is important because understanding how something works (physiology) is more relevant to curing disease.
d) It is important because physiology exists to develop the correct anatomy.