

Anatomy

The study of the name, location, and structure of body parts

Physiology

The study the how an organism and its body parts function

- Physiology involves the sciences of biology and chemistry
- Physiological processes maintain homeostasis in the body
- Pathophysiology = The physiology of disorders (diseased, injured, and abnormal states of the body)

Homeostasis

The body's ability to steadily maintain internal conditions (such as temperature, pH, and nutrient concentrations) within their normal healthy ranges

- Examples: Normal body temperature = $36.4^{\circ} - 37.2^{\circ}$
Normal blood pH = 7.35 - 7.45
Normal sodium concentration = 135 - 145 mEq per liter
- Proper health requires keeping each internal condition within its normal range.
- For each internal condition, the body has sensors, an integrating center, and effectors. These work together to keep the internal condition within its normal range

✓ Sensors = Body structures that measure an internal condition

✓ Integrating center = A body structure that (a) receives measurements about an internal condition from sensors, (b) compares the measurement from the sensor to the normal set point for the condition, and (c) activates effectors to bring the condition back to its normal set point

✓ Effectors = Body structures that change an internal condition

- For each internal condition, there are two effectors that have antagonistic (opposite) effects.

- One effector increases the condition and the other decreases the condition

- Negative feedback loop = When the integrating center shuts off an effector after the effector has brought the internal condition back into the normal range

Fig 1.10

The hierarchy of biological structures:

- Organ systems are made of organs
- Organs are made of tissues
- Tissues are made of cells
- Cells are made of organelles
- Organelles are made of atoms and molecules

[Figs 1.3, 1.4, and 1.5](#)