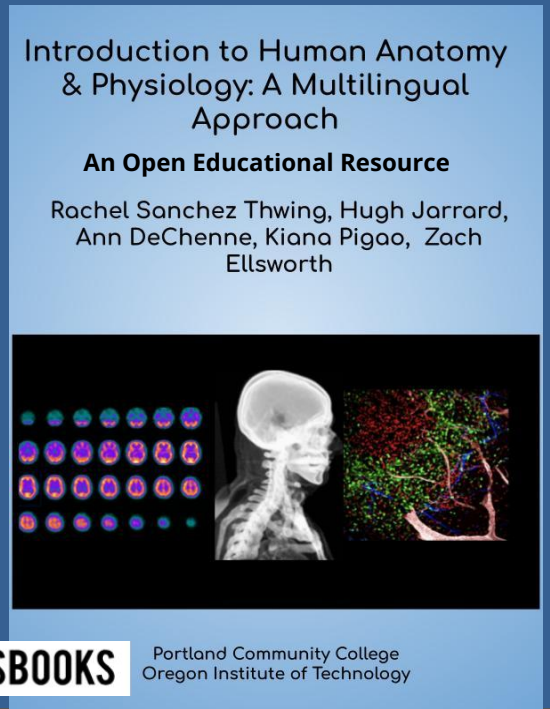
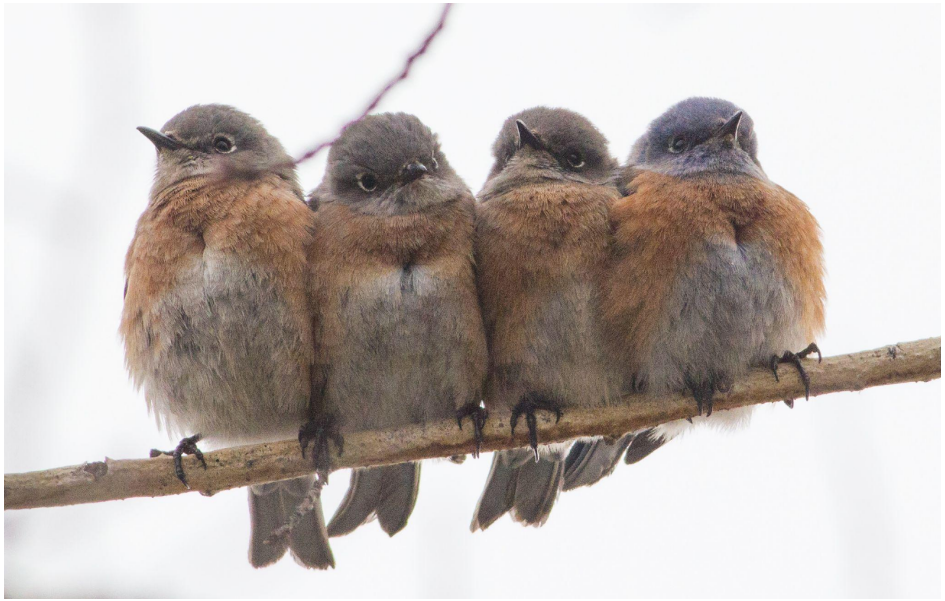
Organization and Homeostasis of the Human Body: Homeostasis





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Lesson 2: Homeostasis

Learning Objectives:

- Define homeostasis and describe the multiple levels of homeostatic maintenance in physiology.

- Compare and contrast positive and negative feedback regarding the relationship between stimulus and response.

See the Body Organization & Homeostasis Wordlist!

- Can be found in accompanying materials to this lecture
- Materials are available in Spanish, Russian, Vietnamese, Filipino, East African French, Kiswahili (Swahili) and Chinese.

Module 1 Body Organization and Homeostasis Word List

Body Planes/Sections
Coronal
Oblique
Sagittal
Transverse

Directional Terms
Anterior vs Posterior
Deep vs Superficial
Distal vs Proximal
Dorsal vs Ventral
Inferior vs Superior
Lateral vs Medial

Body Regions
Abdominal
Acromial
Antecubital
Axillary
Brachial
Buccal
Carpal
Cephalic
Cervical
Coxal
Crural
Cranial
Digital
Facial
Femoral
Fibular
Frontal
Genital
Gluteal
Hallux
Inguinal
Lumbar
Mammary
Mental
Nasal
Occipital
Oral
Orbital/Ocular
Otic
Palmar
Patellar
Pectoral
Pedal
Pelvic
Perineal
Plantar
Popliteal
Pollex
Pubic
Sacral
Sternal
Tarsal
Thoracic
Umbilical
Vertebral

Cavities
Dorsal Cavity
  Cranial Cavity
  Spinal Cavity
Ventral Cavity
  Thoracic Cavity
    Mediastinum
    Pericardial Cavity
    Pleural Cavity
  Abdominopelvic Cavity
    Abdominal Cavity
    Pelvic Cavity

Membranes
Visceral vs Parietal
Peritoneum

Body Systems (general function)
Cardiovascular System
Digestive System
Endocrine System
Integumentary System
Lymphatic/Immune System
Muscular System
Nervous System
Reproductive System
Respiratory System
Skeletal System
Urinary System

Homeostasis
Control Center
Homeostasis
Effector
Negative Feedback
Positive Feedback
Receptor
Set Point

General Terminology
Anatomy
Gross Anatomy
Microscopic Anatomy
Regional Anatomy
Systemic Anatomy
Physiology

Techniques
Palpation
Auscultation
Percussion

Homeostasis Definition

What is homeostasis?

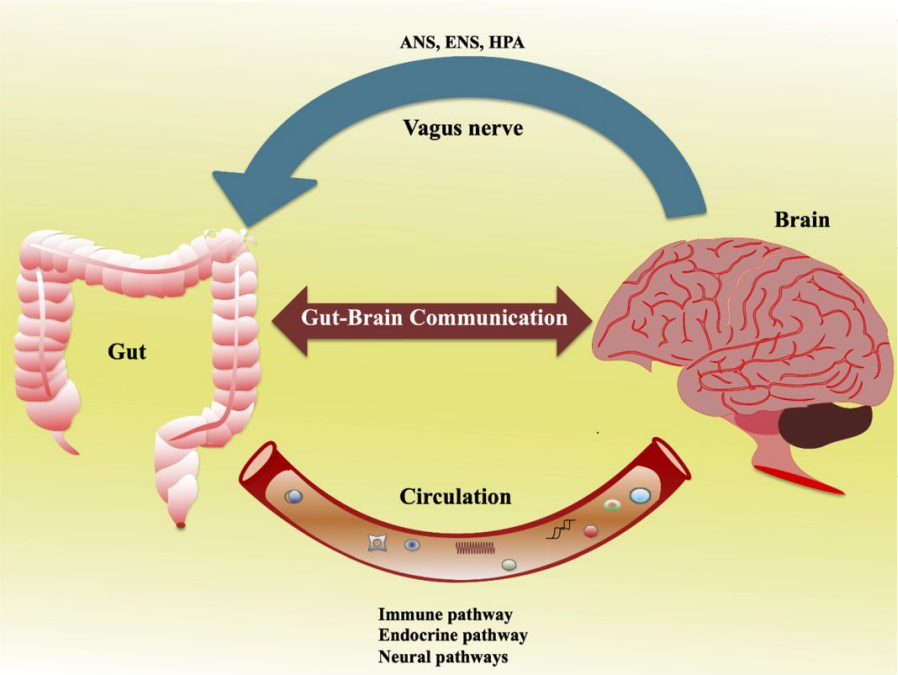
- Maintaining stable internal conditions
- Dynamic equilibrium
- Critical for survival

Regulators of Homeostasis

What **controls** homeostasis?

- Nervous system
- Endocrine system

Example: Gut-Brain Axis



Gut-Brain Interactions By Suganya, Kanmani, and Byung-Soo Koo - CC BY 4.0, via Wikimedia Commons

Homeostatic Imbalance

What happens if there is not homeostasis?

Disease

Feedback Mechanisms: Negative Feedback Thermostat

Negative Feedback

- Most homeostatic control mechanisms
- Shuts off or reduces original stimulus
- Similar to household thermostat

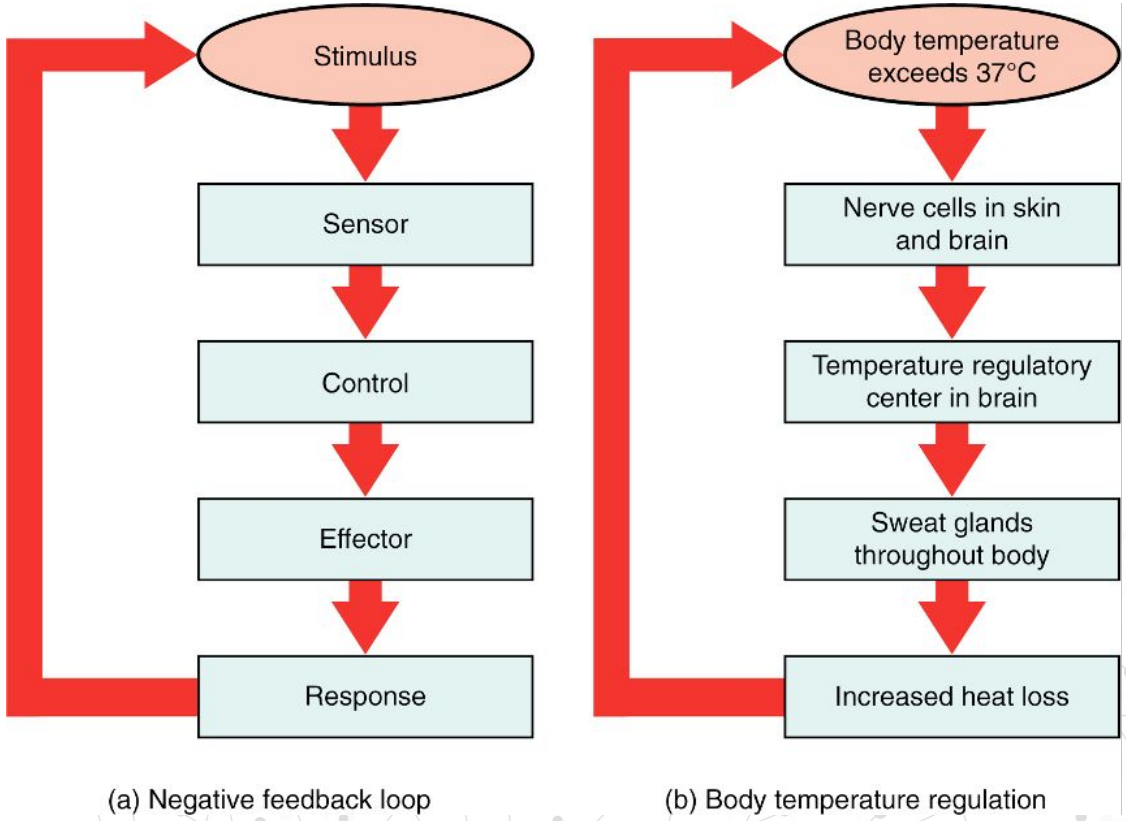
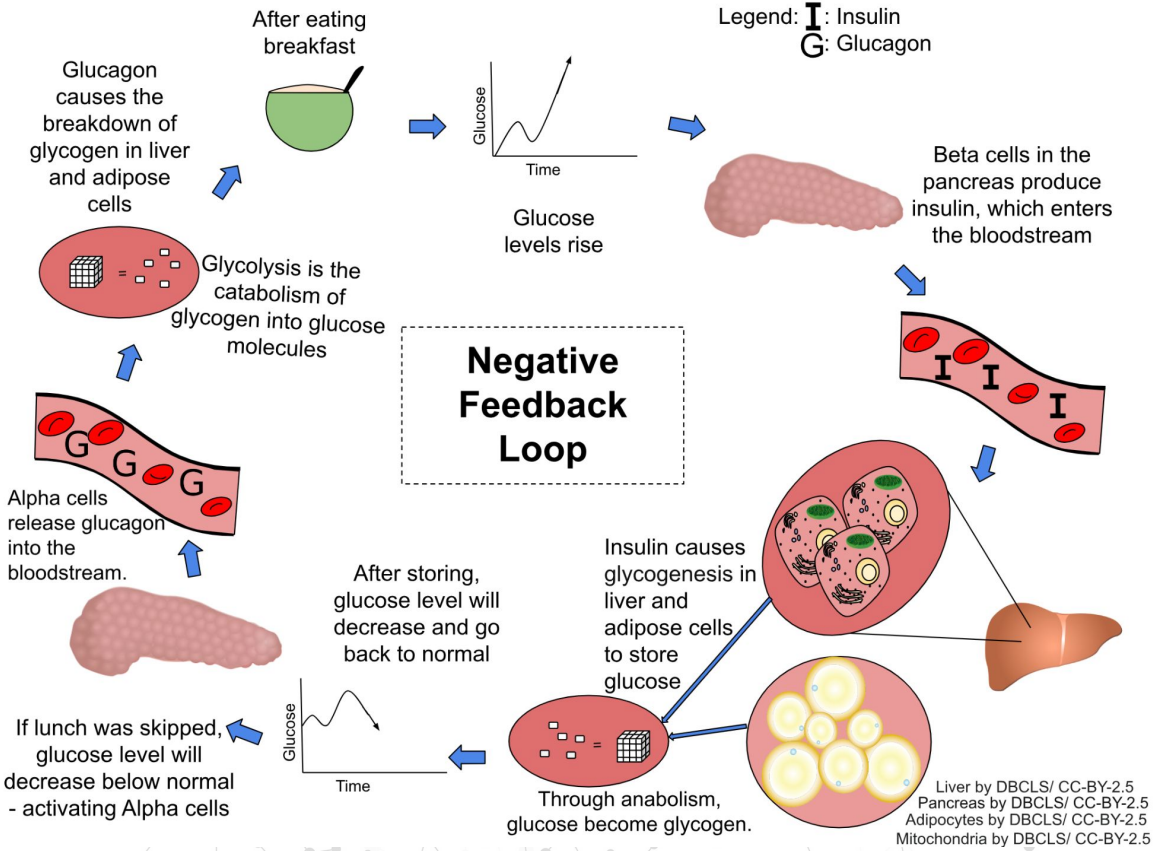


Figure 1.10 by Openstax, A&P

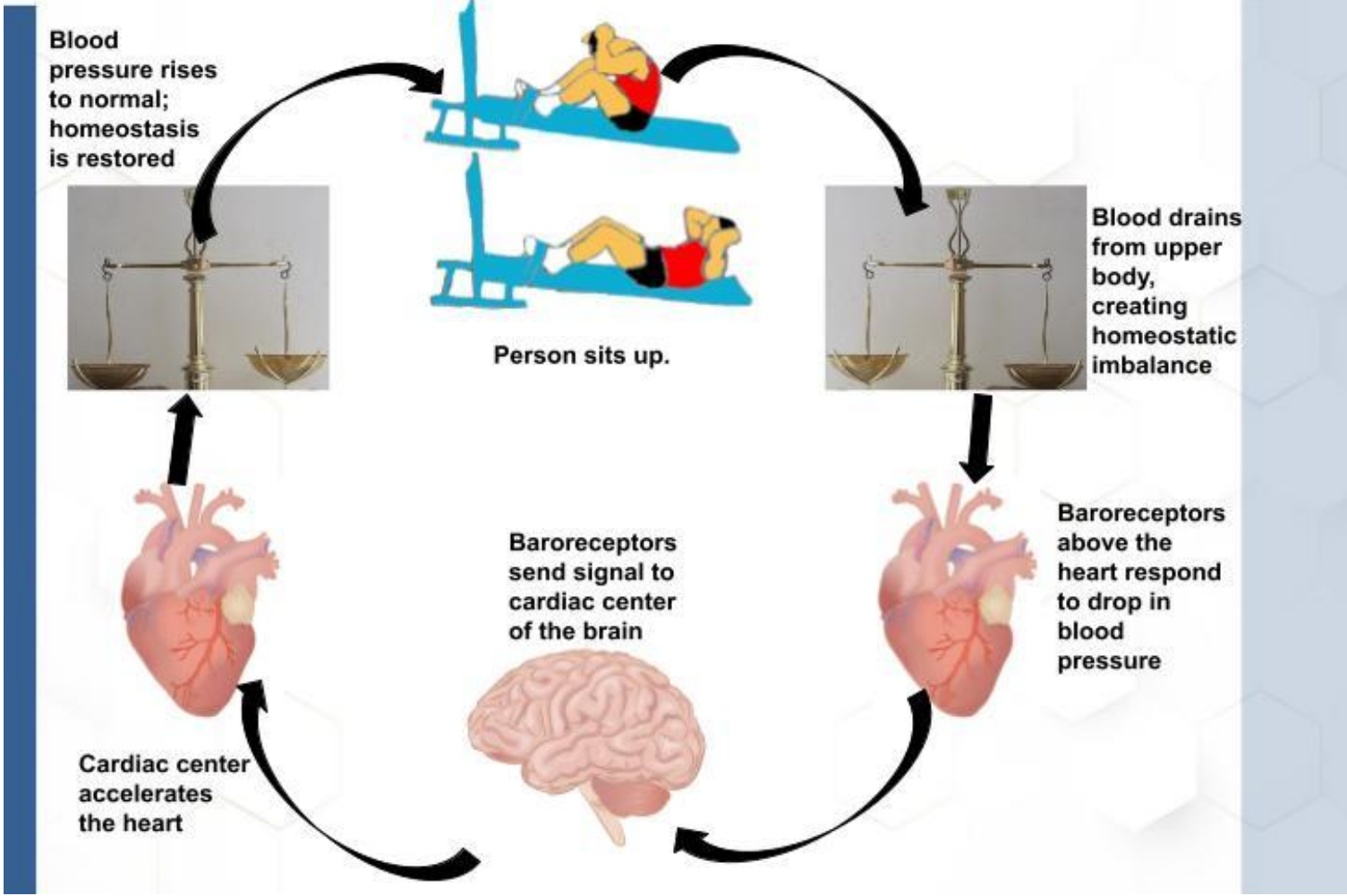
Negative Feedback Loop: Regulation of Blood Glucose

Example

- Regulation of glucose levels in the blood
- Similar to household thermostat



Negative Feedback: Body Posture and Blood Pressure



Feedback Mechanisms

Positive Feedback

- Rare in the human body
- Increases the original stimulus to push the variable farther
- Reaction occurs at a faster rate
- Examples:
  - Blood clot formation
  - Birth of a baby

Positive feedback example: the Oxytocin Loop

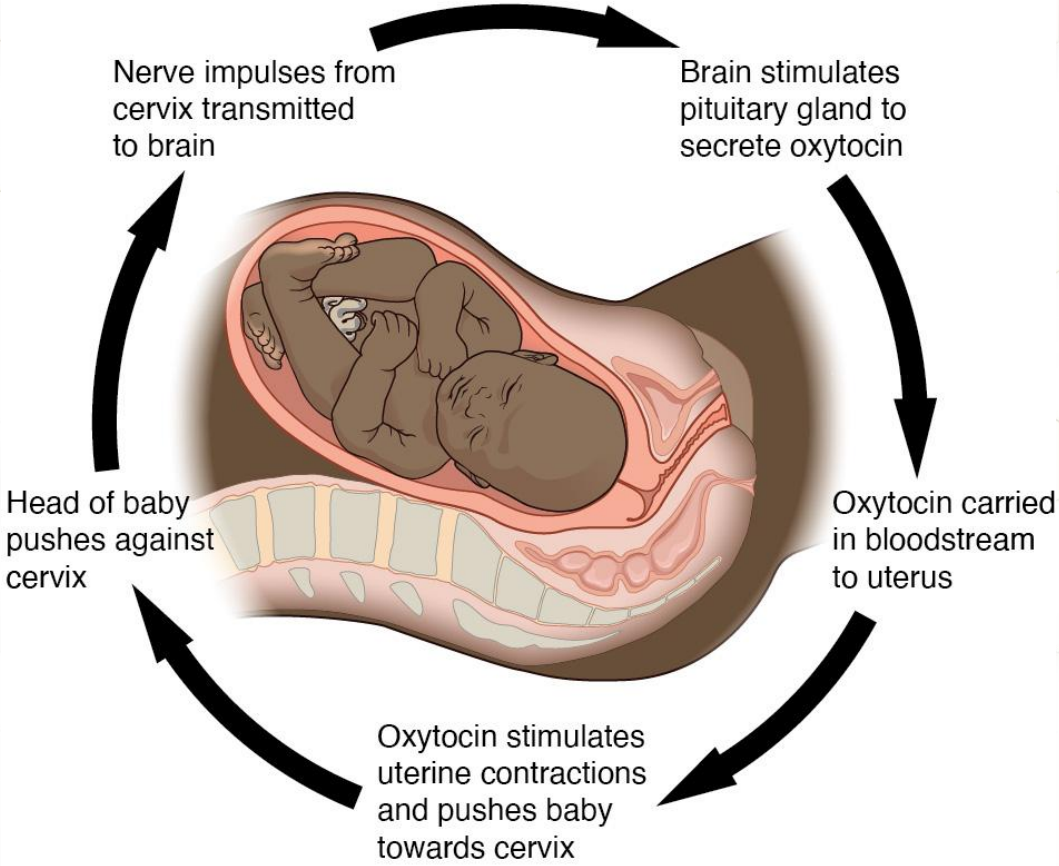
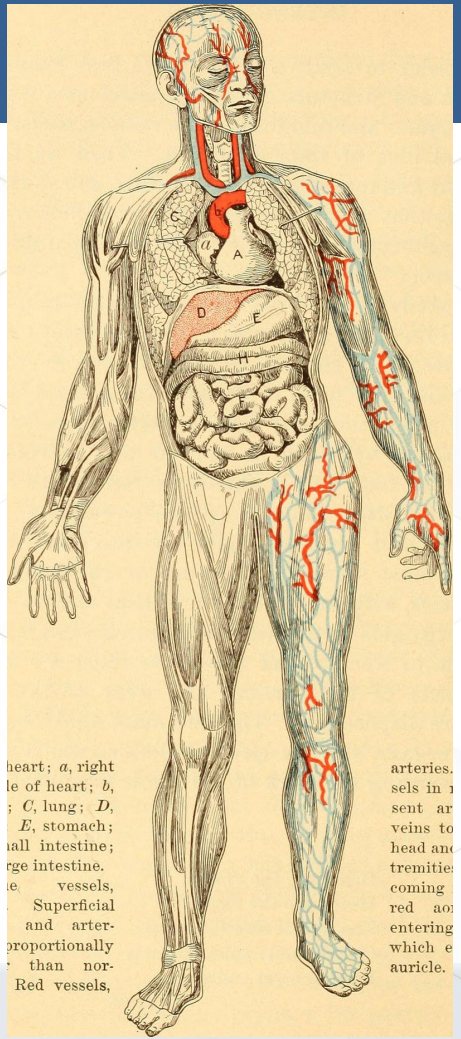


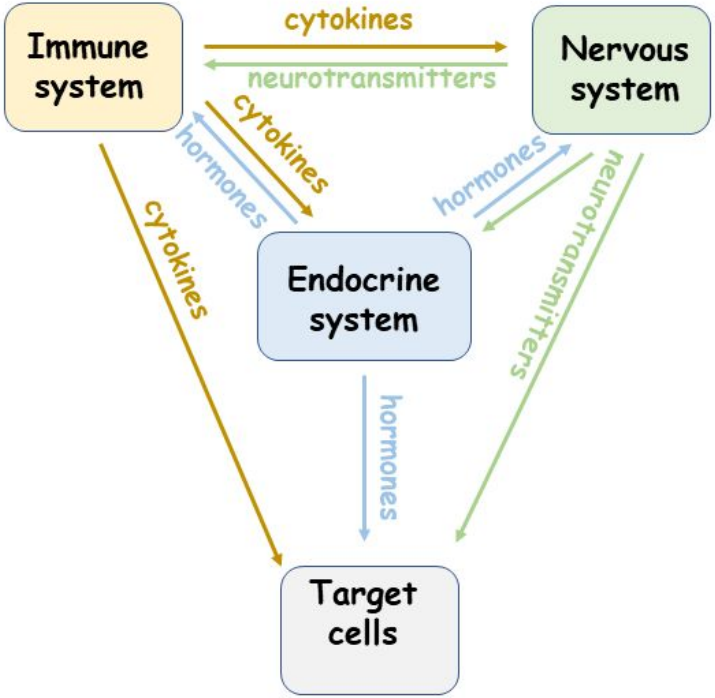
Figure 1.11 by Openstax, A&P

Summary

- Homeostasis keeps the body in balance
- Negative feedback loops are most common and turn off the original stimulus
- Positive feedback loops are least common and perpetuate the original stimulus



Immune, Neural, and Endocrine Interactions



Immune, Neural, and Endocrine Systems Interactions by Alan Sved, CC BY-SA 4.0, via Wikimedia Commons