WELLNESS AND HOMEOSTASIS

PART 2: HOMEOSTASIS & NEGATIVE FEEDBACK

TOPICS COVERED

- **B11-1-04**: Describe how the body attempts to maintain an internal balance called homeostasis, recognizing that the conditions in which life processes can occur are limited.

- **B11-1-05**: Explain the principle of negative feedback and identify how the body stabilizes systems against excessive change.

HOMEOSTASIS

WHAT IS HOMEOSTASIS?

- **Homeostasis**:
  - **an organism's regulation of its internal environment to maintain conditions suitable for survival**
  - Process of maintaining equilibrium in cells' internal environments
  - This is a characteristic of all living things
  - Examples: Thermoregulation, osmoregulation, waste management

HOMEOSTASIS

- Homeostasis is said to a "***dynamic equilibrium***"
  - Dynamic = constant change
  - Equilibrium = state of balance
- This means there is **constant change** happening in the body to maintain a balance of multiple factors

HOW DOES THE BODY CHANGE?

- What happens when your body is too hot?

SWEAT, Redness

- What happens when your body does not have enough water?

headache, dry mouth, hungry, weakness

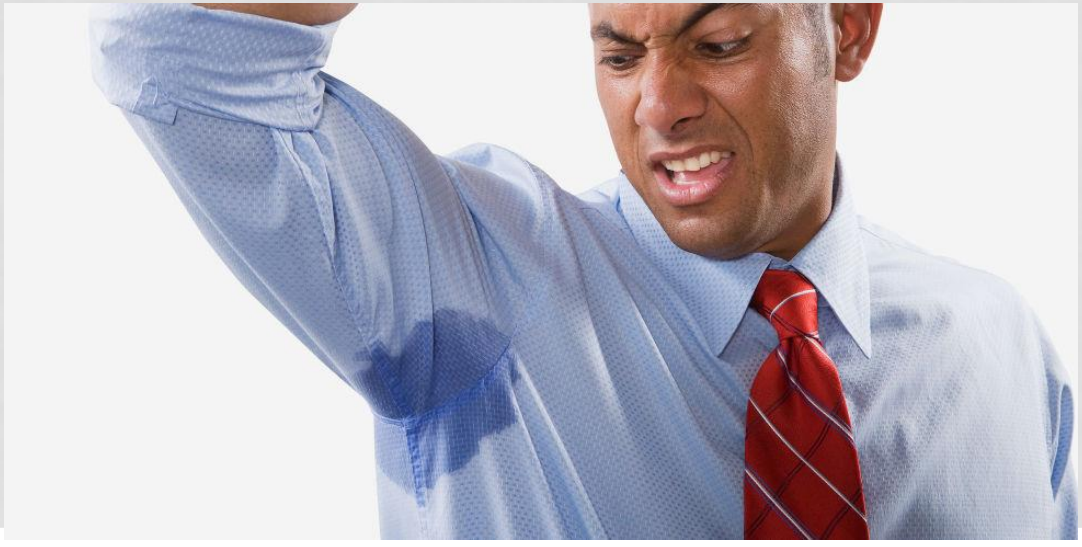
- What happens when your body has too much of a certain nutrient?

Excrete it

EXAMPLES OF HOMEOSTASIS

- ***Thermoregulation***
  - Maintenance of body temperature

- ***Osmoregulation***
  - maintenance of water levels



WHAT'S NORMAL?

- Body Temperature: **37°C**
- Blood Pressure: **120/80 mmHg**
- Blood pH: **7.4**
- Blood Glucose: **100mg/mL**

WHAT CONTROLS THIS IN YOUR BODY?

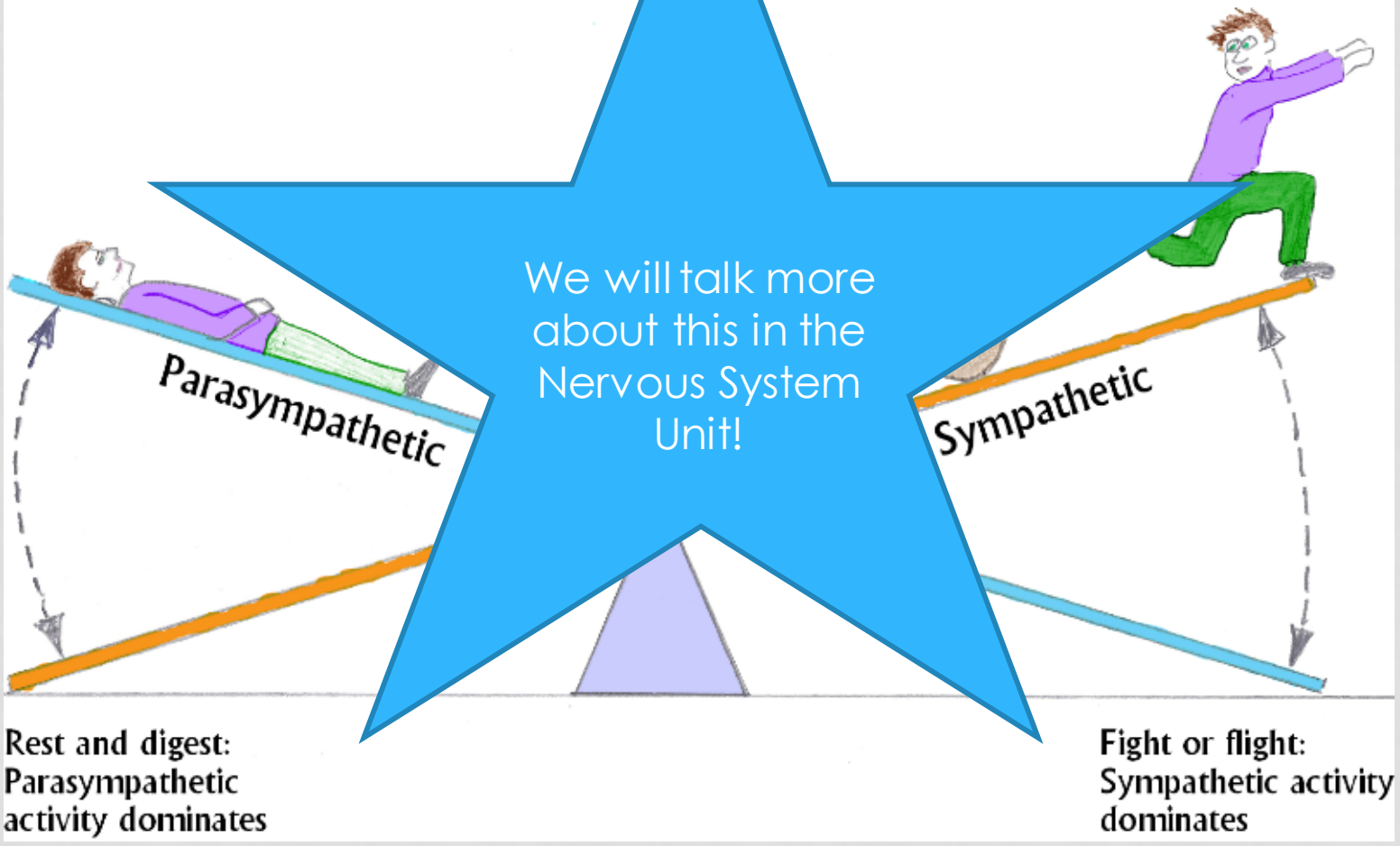
- **Autonomic nervous system** = part of your nervous system that controls the functions of your internal organs.
  - It is not constantly directed by your brain.
  - This is what controls the homeostasis of your body.
  - Examples of what it controls include breathing, digestion, and heartbeat.

AUTONOMIC NERVOUS SYSTEM

- It has two branches:
  - **Parasympathetic**: The "rest and digest" or "feed and breed" system.
  - **Sympathetic**: The "flight or fight" system.

AUTONOMIC NERVOUS SYSTEM

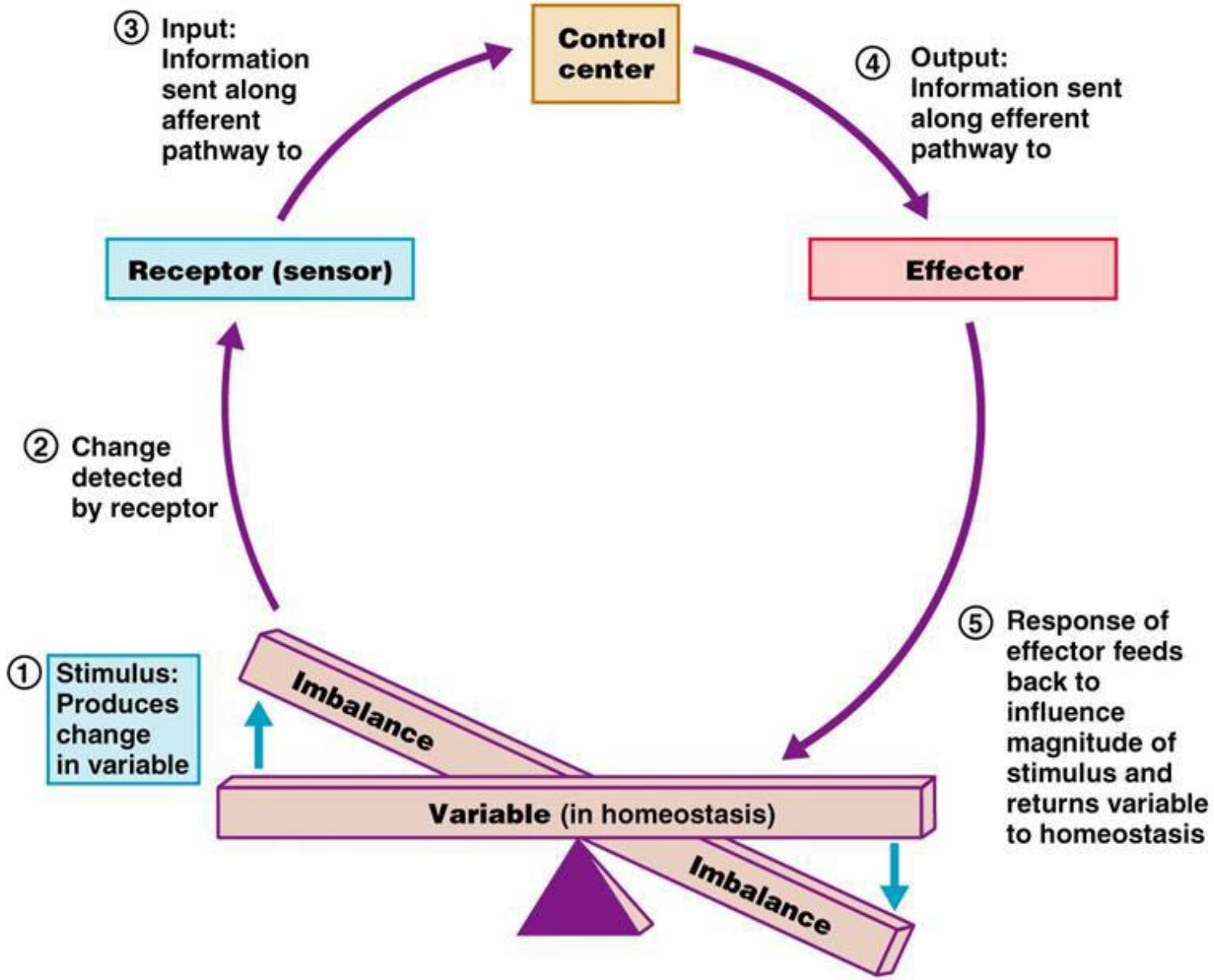
Homeostasis is a dynamic balance between the autonomic branches.

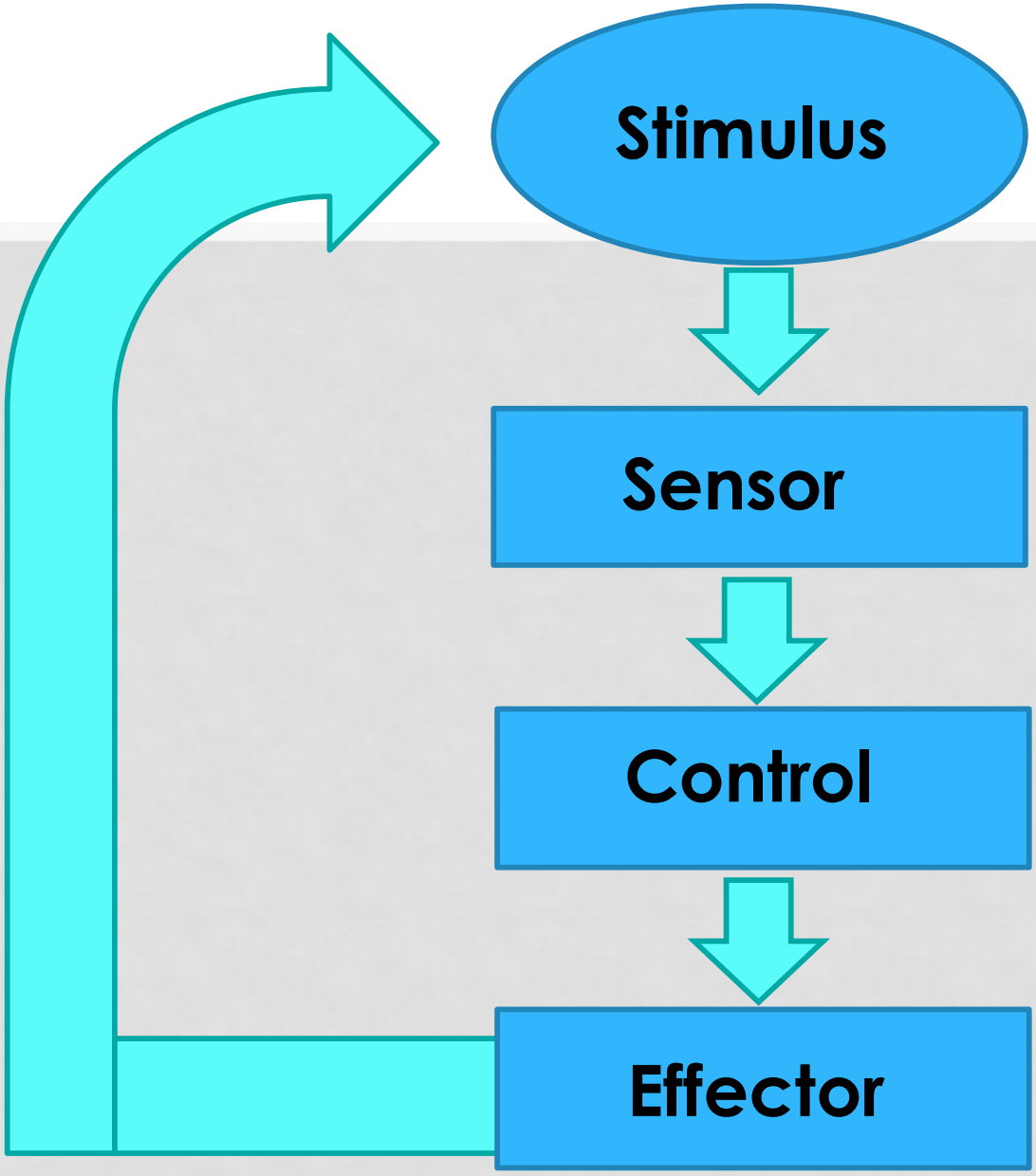


NEGATIVE FEEDBACK

NEGATIVE FEEDBACK SYSTEM

- **Negative feedback system** = **internal feedback mechanism in which a substance is fed back to inhibit the original signal and reduce production of a substance.**
- In other words, the increase in a stimulus results in a chain of events meant to decrease the stimulus.
- This is done through the use of **sensors**, **coordinating center**, and **effectors**.
- This is the how your body regulates various things including temperature, water levels, and waste management.


③ Input: Information sent along afferent pathway to
Control center
④ Output: Information sent along efferent pathway to
Receptor (sensor)
Effector
② Change detected by receptor
⑤ Response of effector feeds back to influence magnitude of stimulus and returns variable to homeostasis
① Stimulus: Produces change in variable
Imbalance
Variable (in homeostasis)
Imbalance


Stimulus
Sensor
Control
Effector

Thermoregulation