Homeostasis

by Sophia

WHAT'S COVERED

In this lesson, you will learn how to understand how the human body maintains homeostasis. Specifically, this lesson will cover:

1. Homeostasis

Homeostasis is the maintenance of a constant internal environment.

This constant internal environment is maintained in several ways. Changes in your extracellular fluids, which are the fluids outside of your cells, need to be stabilized so cells can function properly. Cells function best when they're in a certain type of environment, so the pH, the concentration of solutes, the temperature, et cetera, all need to be maintained. If there's some sort of change in this extracellular fluid, your body will try to reverse that change to maintain homeostasis.

Homeostasis maintains the makeup and volume of extracellular fluids. Cells, tissues, organs, and organ systems all function together to try to maintain homeostasis.

Within our body, we also have sensors, integrators, and effectors that will interact to help maintain homeostasis.

TERM TO KNOW

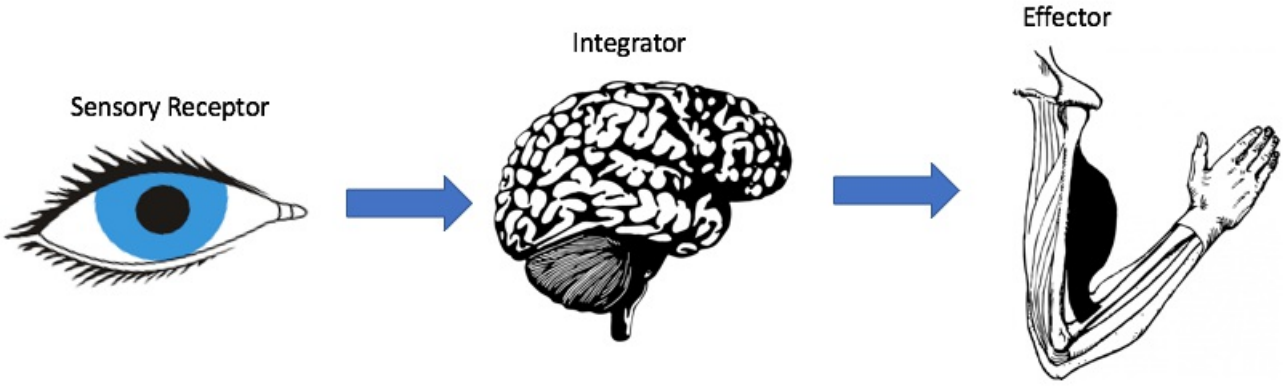
Homeostasis

The maintenance of a constant internal environment.

2. Sensors, Integrators & Effectors

Sensors, or **sensory receptors**, are cells found throughout our body that sense a stimulus or change. The eye is a visual for this, but you actually have different types of sensory receptors throughout your body that detect changes or detect a stimulus.

The brain is the main **integrator** in our body. **Effectors** are either muscle or gland cells.



These types of cells will all work together to maintain homeostasis. Sensory receptors will detect some sort of stimulus or change within your body. That information will then be sent to the integrator, which is your brain. Your brain will gather that information and process it and then determine the appropriate response necessary for homeostasis to be maintained. Whatever response it decides is appropriate, it will send that information to your effectors, which are your gland or muscle cells, to carry out that response to maintain homeostasis.

IN CONTEXT

Throughout your skin, you have thermoreceptors, which are a type of sensory receptor that detects changes in temperature. Let's say those thermoreceptors determine that it is too cold, and your body temperature starts to drop. Your brain will then receive the information that your body temperature is dropping because cells have to be in certain conditions to function optimally.

If the temperature is too low, your body and your organs are not going to function as well as they would otherwise. Your brain will then determine an appropriate response to help maintain your internal body temperature.

If you're too cold, a shiver is one thing that your brain might determine is an appropriate response. That information will then be sent to your muscle cells and you will begin to shiver, which produces body heat.

TERMS TO KNOW

Sensory Receptors
Receptors located throughout your body that detect a stimulus.

Integrator
Your brain is the integrator that senses a stimulus and determines an appropriate response.

Effectors
Muscles or glands that carry out the response designated by the integrator.

3. Negative & Positive Feedback

Homeostasis is maintained by either negative or positive feedback.

Negative feedback is the most common type of feedback that we experience. Negative feedback will reverse a detected change.

Conditions in your extracellular fluid might experience changes at times. Maybe the pH changes, the temperature changes or the chemical makeup changes. Sensory receptors will detect that change. The change will then be reversed to maintain homeostasis, as cells need to be in an environment that's relatively constant.

If the pH or temperature gets too high or too low, cells aren't going to be able to function properly, meaning that other body mechanisms aren't going to function properly either. So it's really important that homeostasis is maintained.

Positive feedback is rarer in the body, and it doesn't have a huge effect on homeostasis. Again, when you're talking about homeostasis, you're talking about the maintenance of our extracellular fluids.

Positive feedback will detect a change and, rather than reversing it, will actually intensify it.

IN CONTEXT

A common example is childbirth. In childbirth, the fetus will exude pressure on the mother's uterus. The uterus will then exude pressure on the fetus back and forth. This will keep intensifying until, finally, the fetus is expelled. Rather than that change reversing, it is actually being intensified.

TERMS TO KNOW

Negative Feedback
A feedback mechanism that maintains homeostasis by reversing the change.

Positive Feedback
A feedback mechanism that intensifies a detected change.

MAKE THE CONNECTION

If you're taking the Human Biology Lab course simultaneously with this lecture, it's a good time to try the Lab Safety Activity in Unit 2 of the Lab course. Good luck!

SUMMARY

This lesson has been an overview of **homeostasis**. You learned more about the details of how **sensors, integrators, and effectors** work together to maintain homeostasis. You also learned that **negative and positive feedback** are both mechanisms of control to help maintain homeostasis.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND

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TERMS TO KNOW

Effectors
Muscles or glands that carry out the response designated by the integrator.

Homeostasis
The maintenance of a constant internal environment.

Integrator
Your brain is the integrator that senses a stimulus and determines an appropriate response.

Negative Feedback
A feedback mechanism that maintains homeostasis by reversing the change.

Positive Feedback
A feedback mechanism that intensifies a detected change.

Sensory Receptors
Receptors located throughout your body that detect a stimulus.