Communication, Regulation, and Homeostasis | KEY

Introduction

1. Define homeostasis.
   
   A steady state or equilibrium between all systems and processes within the body. Provide relative stability of internal environment; results from constant adjustments; regulated by regulatory processes; requires system interplay.

Homeostasis

2. Define normal limits.
   
   These are narrow ranges on either side of the equilibrium point. They provide guidelines for testing and diagnosis.

3. Explain how temporary stresses can be accommodated by physiological changes.
   
   Temporary stresses can disrupt homeostasis. The body’s regulatory systems can quickly respond and restore homeostasis when stress is mild and temporary.

4. Describe a homeostatic disruption that may require medical intervention?
   
   Severe stress disrupts homeostasis and can cause a disease state and require medical intervention. Such an example is when blood pressure becomes extreme such as 160/90 where regulation of homeostasis may fail.

Communication and Regulation

5. How are the nervous and endocrine systems critical to maintaining homeostatic balance?
   
   The nervous and endocrine systems are the primary systems for communication and regulation.
6. Define a feedback system. What is a controlled condition?

A feedback system is a mechanism where the result or action of the system has an influence on the stimulus or stress. A negative feedback system results in the reduction or elimination of the stress. A positive feedback system results in sustaining or increasing the stress.

A controlled condition is one where the condition limits are regulated by feedback mechanisms.

7. Explain the three parts of a feedback system:

Receptor – these are sensory structures such as neurons that monitor changes in controlled conditions.

Control center - this is often the hypothalamus which sets a range of values for the controlled condition and evaluates input and compares it to normal values. Communicates with motor nerve impulses and causes the release of neurotransmitters than bind to cell membrane receptor sites

Effector – these are target cells that receive output for the control center and effects a response that adjusts the altered controlled condition.

8. Contrast the functions of negative and positive feedback systems.

Negative feedback reduces or eliminates the stimulus and turns off the mechanism when the condition returns to normal limits. Positive feedback turns ON the mechanism which sustains or amplifies the stimulus.