

Homeostasis

Homeostasis plays a major role in the proper functioning of the body. It is regulated by different mechanisms such as osmoregulation, thermoregulation and chemical regulation by different systems in the body like respiratory system, digestive system, nervous system, urinary system.

The stimulus is generated; the cells act accordingly to maintain the proper functioning of the cell. Thus feedback mechanisms work and maintain the cells to meet the set point.

The endocrine system has a regulatory effect on other organ systems in the human body.

Introduction

Homeostasis is the word derived from the 2 Greek Words 'homeo' meaning 'similar,' and 'stasis' meaning 'stable.'

Homeostasis refers to stability, balance, or equilibrium within a cell or the body.

Homeostasis is an important characteristic of living things. Maintaining a stable internal environment which requires adjustments as conditions change inside and outside the cell.

The maintenance of systems within a cell is called homeostatic regulation. The continuous adjustments are made to meet the Set Point.

Feedback Regulation

Hormones regulate the activity of body cells. The release of hormones into the blood is controlled by a stimulus. The response to a [stimulus](#) changes the internal condition and this self-adjusting mechanism by the internal system is called feedback regulation.

The feedback regulations are of 2 types:

1. Positive feedback regulation.
2. Negative feedback regulation.

Positive feedback regulation

Positive feedback is less common in biological systems. Positive feedback acts to speed up the direction of change.

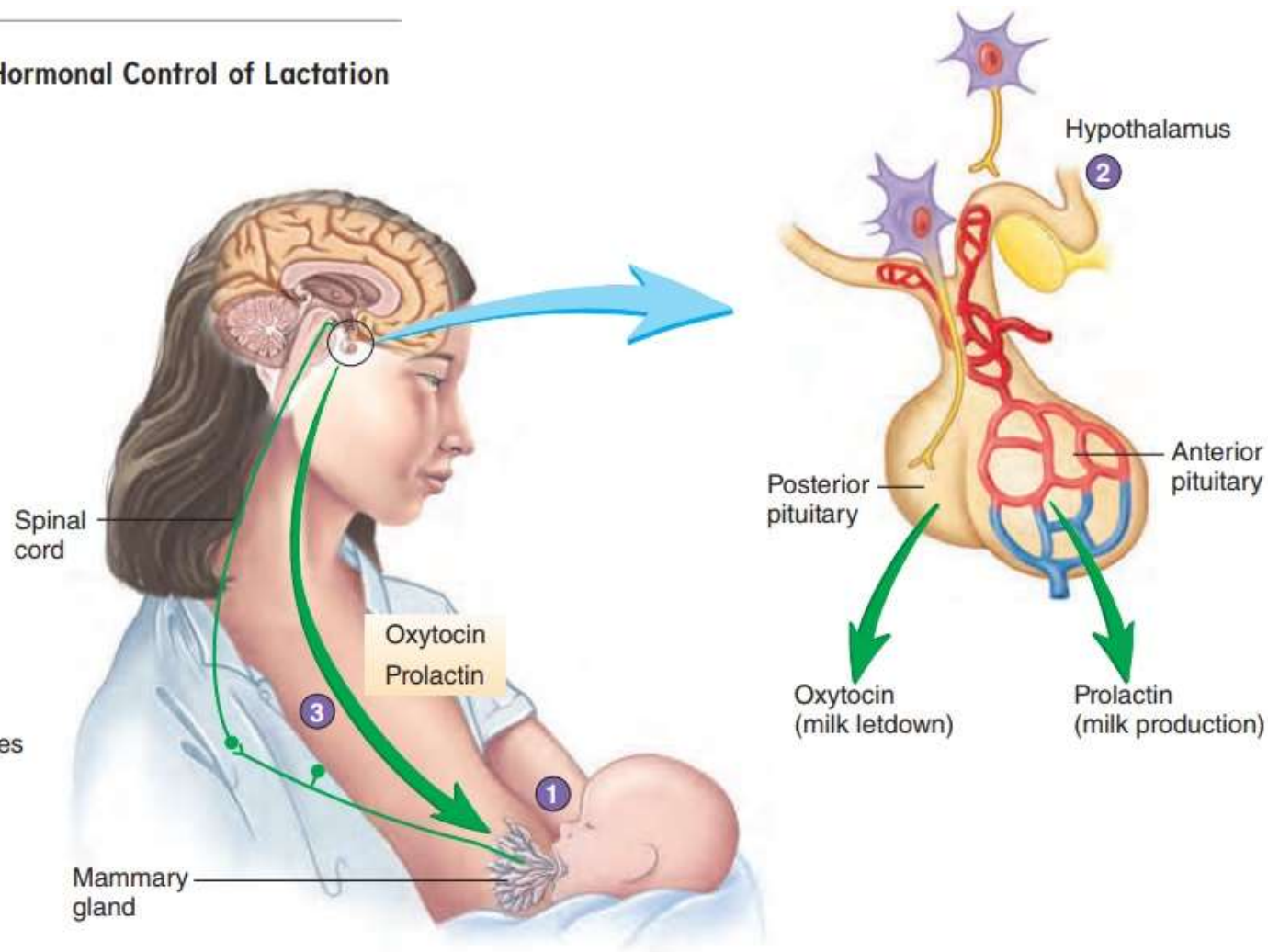
e.g. [Lactation](#) (milk production).

The sucking(stimulus) activates receptors in and around nipple.

These signals are carried by nerve fibers through the spinal cord to the hypothalamus where changes in the electrical activity of the neurons that regulates the pituitary glands increase prolactin secretion.

PROCESS Figure 20.17 **AP|R** Hormonal Control of Lactation

- 1** Stimulation of the nipple by the baby's suckling initiates action potentials in sensory neurons that connect with the hypothalamus.
- 2** In response, the hypothalamus stimulates the posterior pituitary to release oxytocin and the anterior pituitary to release prolactin.
- 3** Oxytocin stimulates milk release from the breast. Prolactin stimulates additional milk production.



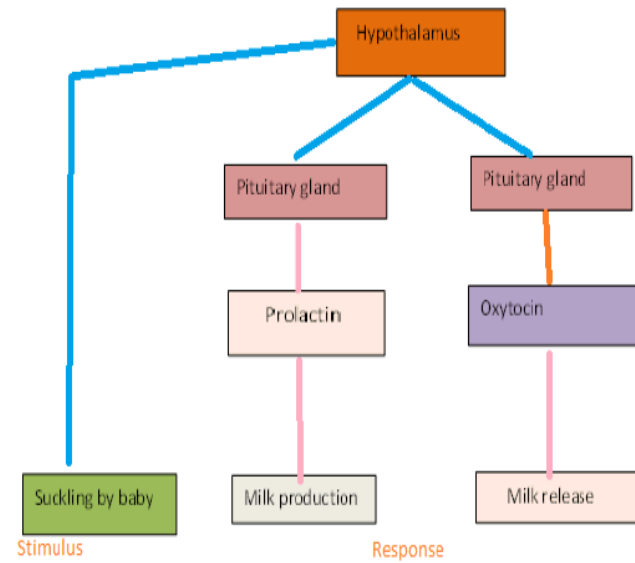


Figure 2: Postive feedback mechanism (lactation).

Negative Feedback regulation

Negative feedback is the most common feedback loop in the biological system. To maintain the homeostatic balance the system acts to reverse the direction of change to maintain the things constant.

Example :

- Blood sugar regulation(insulin lowers blood glucose when level are high, glucagon raises blood glucose when levels are low).

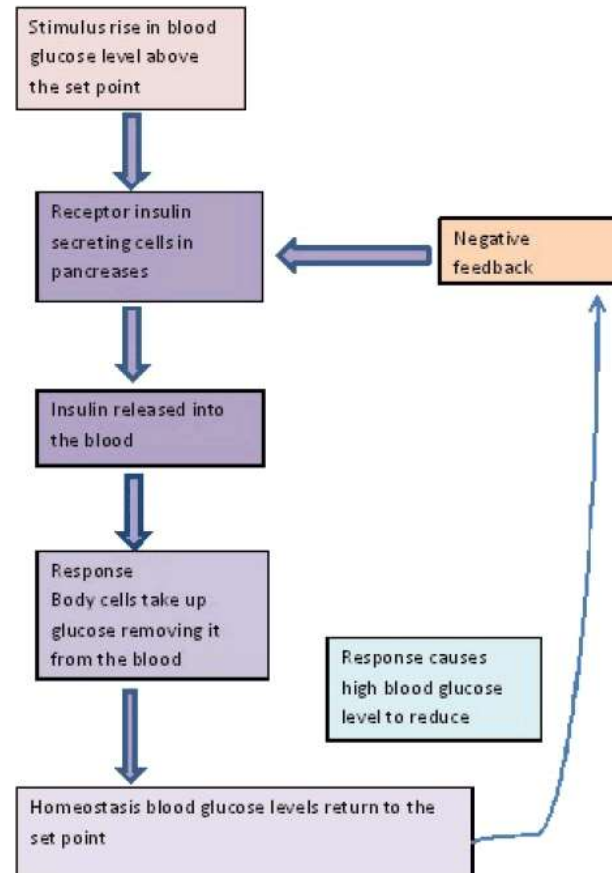


Figure 6: Flow chart of chemical regulation in blood.

References :

Human physiology, Stuart Ira Fox.
Fundamentals of anatomy and physiology, Martini.