UNIT- 1

HOMEOSTASIS

Homeostasis:

- It refers to the maintenance of constant internal environment of the body (homeo = same; stasis= standing).
- The human organism consists of trillions of cells working together for the maintenance of the entire organism. While cells may perform very different functions, the cells are quite similar in their metabolic requirements. Maintaining a constant internal environment with everything that the cells need to survive (oxygen, glucose, mineral ions, waste removal, etc.) is necessary for the well-being of individual cells and the well-being of the entire body. The varied processes by which the body regulates its internal environment are collectively referred to as homeostasis.
- Physiologically, it is the body's attempt to maintain a constant and balanced internal environment, which requires persistent monitoring and adjustments as conditions change.
- Adjustment of physiological systems within the body is called homeostatic regulation.

Components of homeostatic system:

Homeostatic system in the body acts through self regulating devices, which operate in a cyclic manner. This cycle includes four components:

1. **Sensors** or **detectors,** which recognize the deviation. It is also referred to a receptor and is a component of a feedback system that monitors a physiological value. This value is reported to the control center.

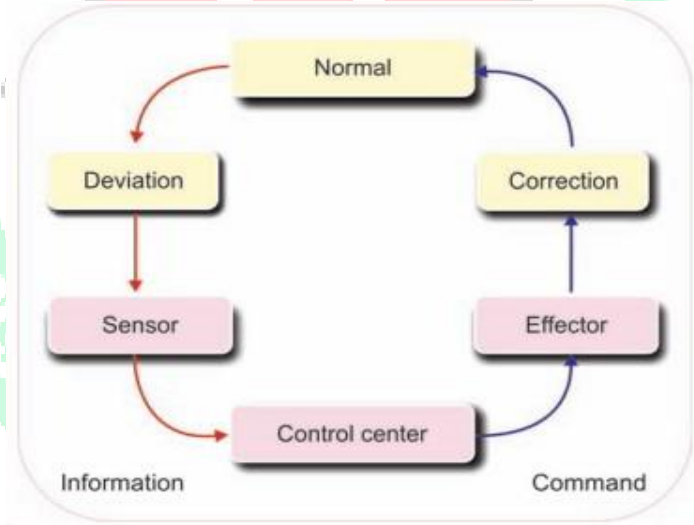
2. Transmission of this message to a **control center.** The **control center** is the component in a feedback system that compares the value to the normal range. If the value deviates too much from the set point, then the control center activates an effector. It is also known as integrating center.

3. Transmission of information from the control center to the effectors for correcting the deviation. Transmission of the message or information may be an electrical process in the form of impulses through nerves or a chemical process mainly in the form of hormones through blood and body fluids

4. **Effectors,** which correct the deviation. An **effector** is the component in a feedback system that causes a change to reverse the situation and return the value to the normal range.

Mechanism of homeostatis:

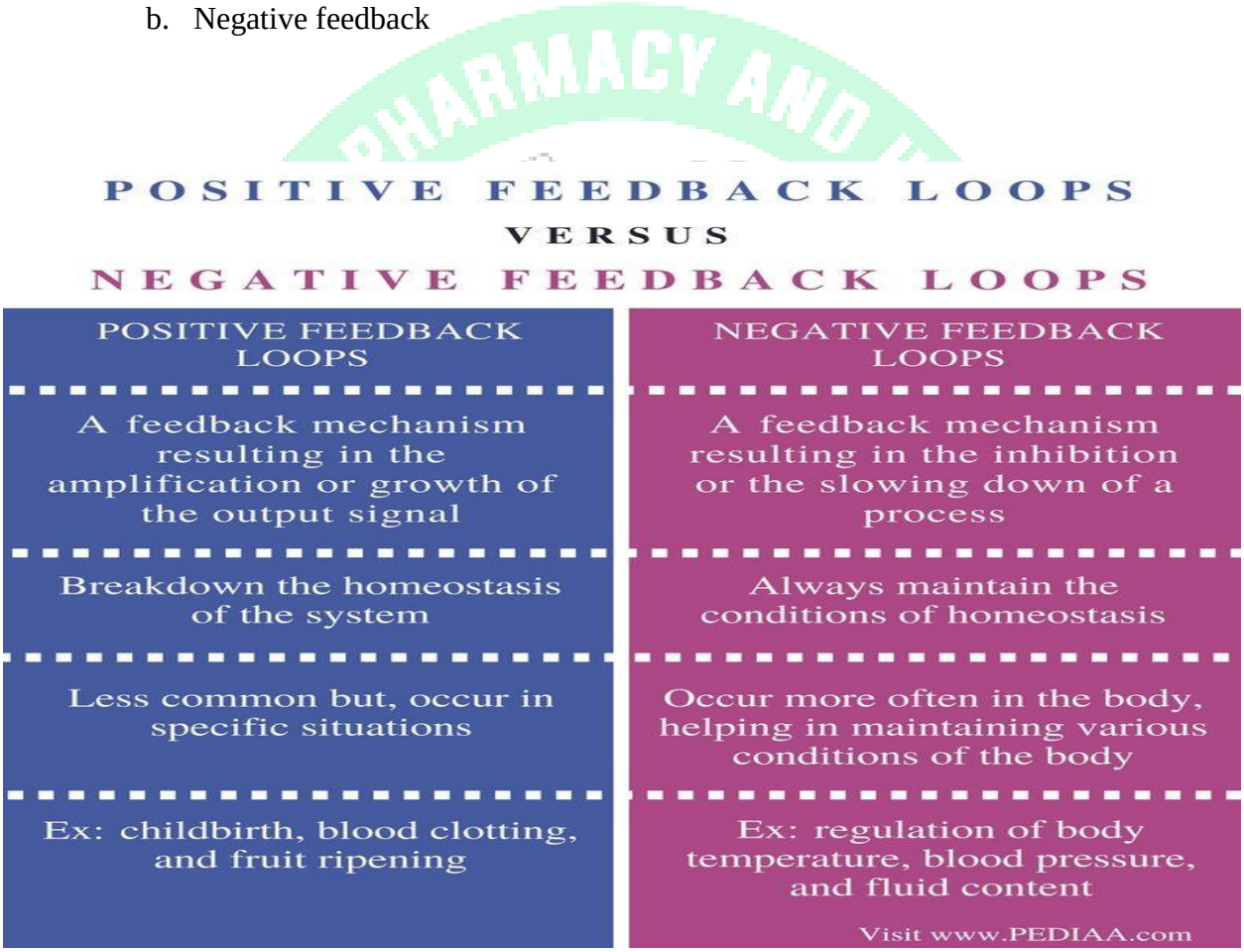
For the functioning of homeostatic mechanism, the body must recognize the deviation of any physiological activity from the normal limits. Fortunately, body is provided with appropriate **detectors** or **sensors,** which recognize the deviation. These detectors sense the deviation and alert the **integrating center.** The integrating center immediately sends information to the concerned **effectors** to either accelerate or inhibit the activity so that the normalcy is restored.



FEED BACK SYSTEM

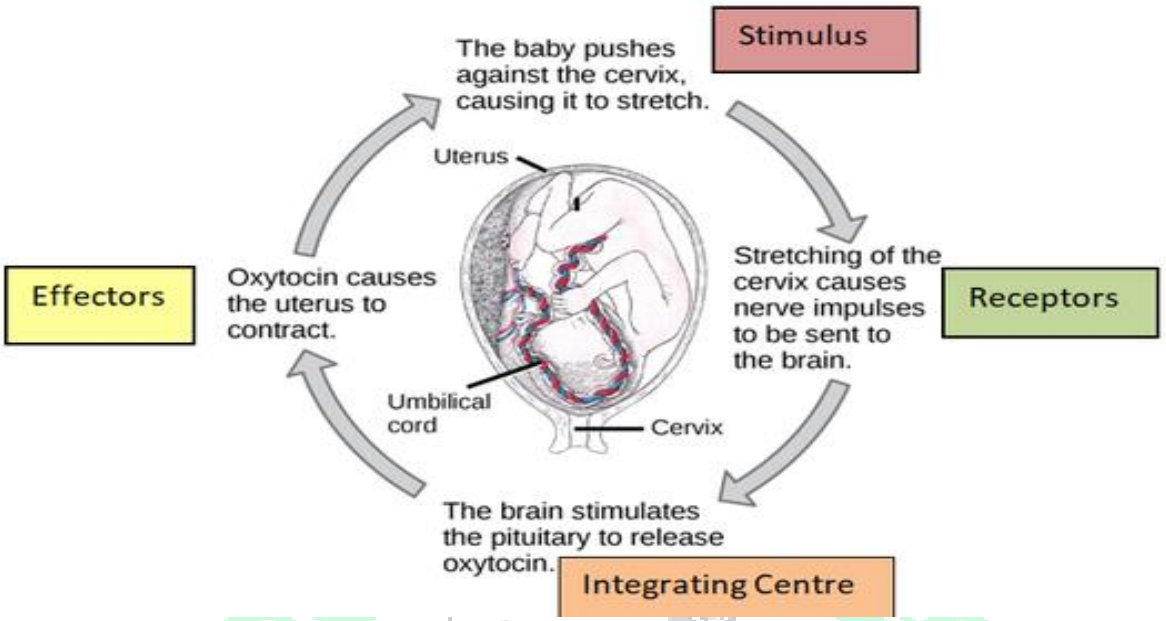
- Homeostatic mechanism in the body is responsible for maintaining the normalcy of various body systems.
- Whenever there is any change in behavioral pattern of any system, the effectors bring back the normalcy either by inhibiting and reversing the change or by supporting and accelerating the change depending upon requirement of the situation.

- This is achieved by means of **feedback signals.**
- Feedback is a process in which some proportion of the output signal of a system is fed (passed) back to the input. This is done more often intentionally in order to control the behavior pattern of the system.
- The two types of feedback are
    a. Positive feedback
    b. Negative feedback



Positive feedback:

- Positive feedback is the one to which the system reacts in such a way as to increase the intensity of the change in the same direction.
- Positive feedback is less common than the negative feedback. However, it has its own significance particularly during emergency conditions.



Negative feedback:

- Negative feedback is the one to which the system reacts in such a way as to arrest the change or reverse the direction of change.