Homeostasis :- It is the process of maintaining stability in internal environment despite there being changes in external environment.

or

It is the process by which our body regulates its internal environment.

- 5 components in feedback system :-

1) sensor :- detects changes in internal/external environment. It senses deviation from a set point and converts these info into signals.

2) afferent pathway :- It relays these signals from the receptors to the hypothalamus of the brain (integration center)

3) Integration/Control center (Comparator) :- It recieves sensory data and compares them to the set point. Then it ~~takes~~ decides on the appropriate response to correct ~~deal~~ this deviation

4) Efferent pathway :- It relays the signal from hypothalamus to the effector organs to carry out the response.

5) Effector organs :- These are tissues/organs that carry out the response directed by the integration center. It is necessary action to bring the internal environment to set point.

- Internal stability is achieved by 2 ways :-

1) Intrinsic :- Also known as auto regulation where the regulation of deviation from set point occurs within the organs/tissue without external influence
Eg :- Blood flow regulation during increased workout.

2) Extrinsic :- Regulation of deviation from set points occurs by external factors which involves signalling from organs/systems.
Eg :- Nervous system & endocrine system.

1. Nervous System:- Maintains homeostasis by controlling & regulating other parts of the body.

* The deviation from a set point acts as a stimulus for the receptor which then sends signals to the CNS. The CNS then sends set of instructions to the effector such that the body is regulated back to its normal set point.

i) Types of Nervous System:-

1) Central Nervous System (CNS):- Consists of the brain & spinal cord. The regulating centers such as hypothalamus is conserned with the homeostasis where:-

- Medulla oblongata:- Regulates blood flow (controls heart rate)
- Peripheral gland:- Controls hormones (like growth hormones)

2) Peripheral Nervous System (PNS):- Consists of spinal nerves.

ii) Types of PNS:-

- Autonomic Nervous System (ANS):- It has motor neurons which control internal organs. ANS are of two types:-

  i) Sympathetic System:- "fight or flight" response
  ii) Parasympathetic System:- "rest and digest" response

- Somatic Nervous System (SNS):- It controls voluntary movements by skeletal muscles.

iii) Example:- In case of increase in temperature in external environment,

- sensor:- thermoreceptor
- Afferent pathway:- sends nerve signals to CNS
- Control center:- recognises high temperature & sends instructions for efferent organs
- Efferent pathway:- Nerve signals transmitted to effector from hypothalamus
- Efferent organs:- Sweat glands produce sweat & blood vessels in skin dialate to release heat.

2. Endocrine System:- It consists of network of glands which secreate special hormones that gets released into the bloodstream

* Each hormones has an affect on one or more target cells which facilitates growth, metabolism and development of most body cells and systems

* Pituitary Gland:- Controls other endocrine glands → "Master gland"

~~Types of Endocrine System~~ glands:-

Interaction with Other Systems:-

i) Nervous System:- Regulates pituitary gland and coordinates hormone responses to various stimuli

ii) Muscular System:- Regulates muscle metabolism, energy production & growth

iii) Cardiovascular System:- Regulates heart rate & blood pressure.

* Adrenal glands:- It has sex hormones which activates sebaceous glands, which helps in development of ~~mamary~~ mammary glands.

~~Positive~~ Feedback Systems:-

1) Positive feedback:- A change in physiological variable which ~~enhances~~ triggers a response that enhances the initial state. It results in driving the system further from its normal state. Eg:- childbirth

2) Negative feedback:- A change in physiological variable which triggers a response that counteracts the initial state. It results in driving the system back to its normal state. Eg:- Rise in body temperature