

# Introduction to Physiology

- Physiology (علم وظائف الجسم) : Studying the functions of various body systems.

Organism > Systems > Organs > tissue > Cells > organelles

\* So Physiology studies  $\left\{ \begin{array}{l} \text{Systems (Like GI system,} \\ \text{respiratory system,} \\ \text{organs nervous system ----)} \end{array} \right.$

- All body systems are working to keep constant parameters of internal environment and this is called Homeostasis.

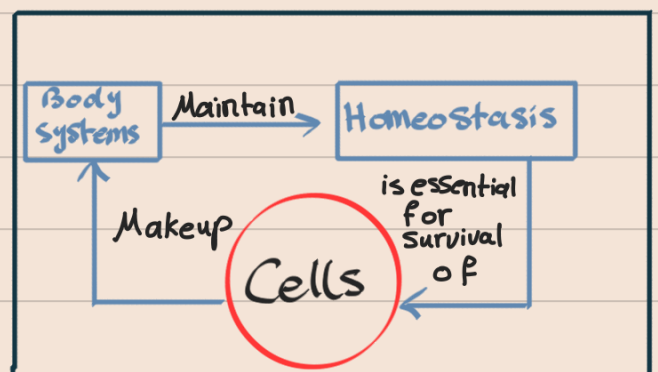
→ Like: Temperature, PH, ions concentration, Blood pressure ...

Note: Homeostasis is dynamic and not fixed.

- To maintain Homeostasis in the body, this happens through what is called [Feedback]

The feedback is caused by a combination of things working together in an integrated manner:

- 1 Receptors or Sensors
  - 2 Control center
  - 3 Effectors
- \* Variables



Note: These examples for understanding purposes only and are not for memorization

# Feedback

## Negative feedback (most common)

ex:-

1] When the blood pressure decreases:-

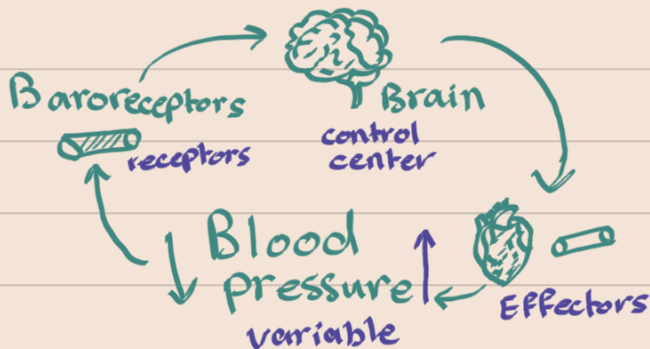
Variable: Blood pressure

Receptors: Baroreceptors

Control center: Brain

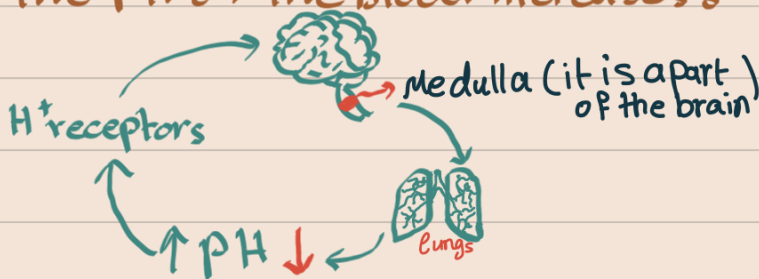
Effectors: Heart and blood vessels

- When the blood pressure decreases, the baroreceptors will detect this change in blood pressure and send a signal to the brain which in turn processes this information and determines the appropriate response which results in an increase in heart rate and also narrowing of the blood vessels.



## normal PH (7.35 - 7.45)

2] When the PH of the blood increases:-



## Positive feedback

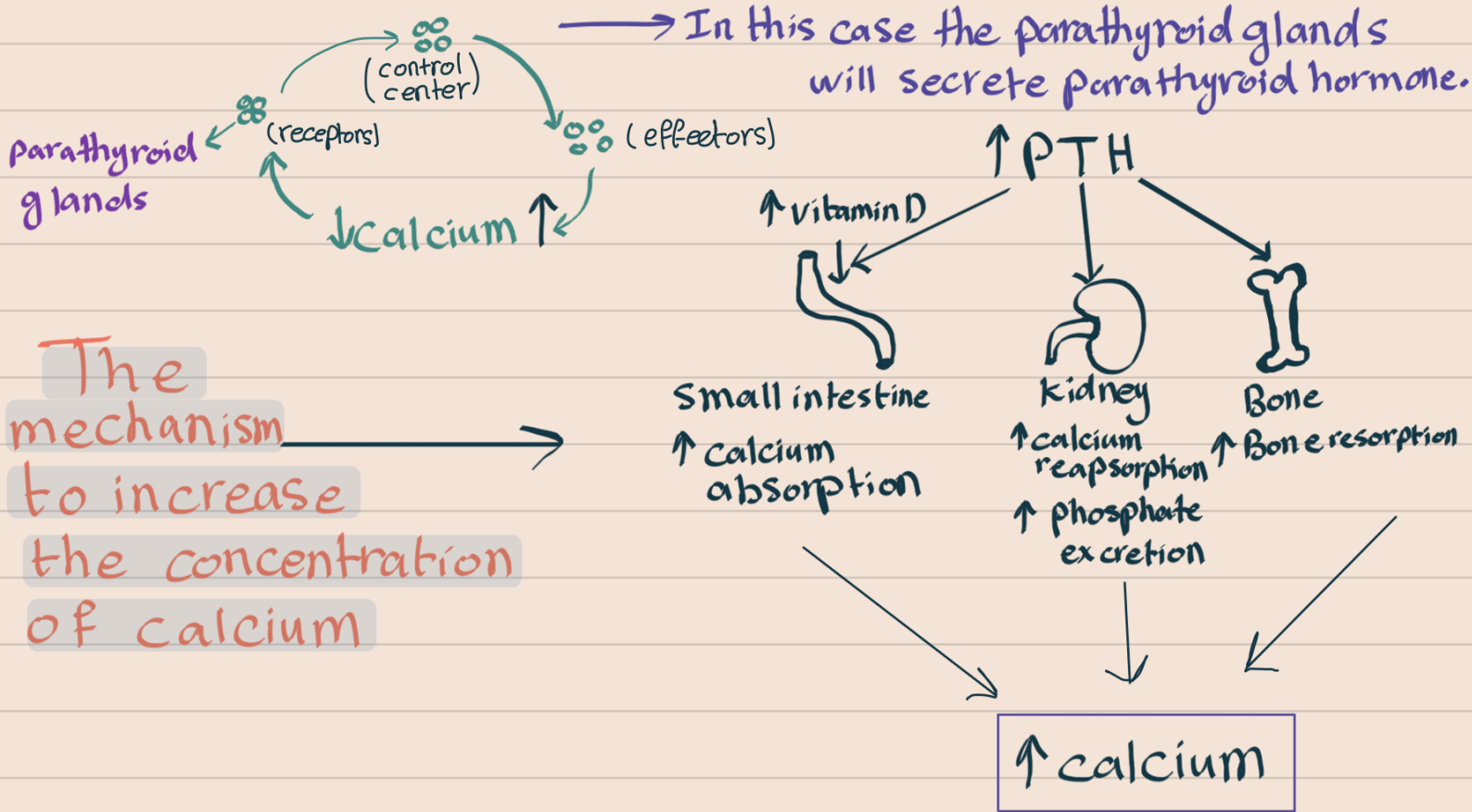
1] Child birth

- Posterior Pituitary Gland secretes (Oxytocin hormone) which stimulates uterine contractions during childbirth to help deliver the baby.

2] Hemostasis

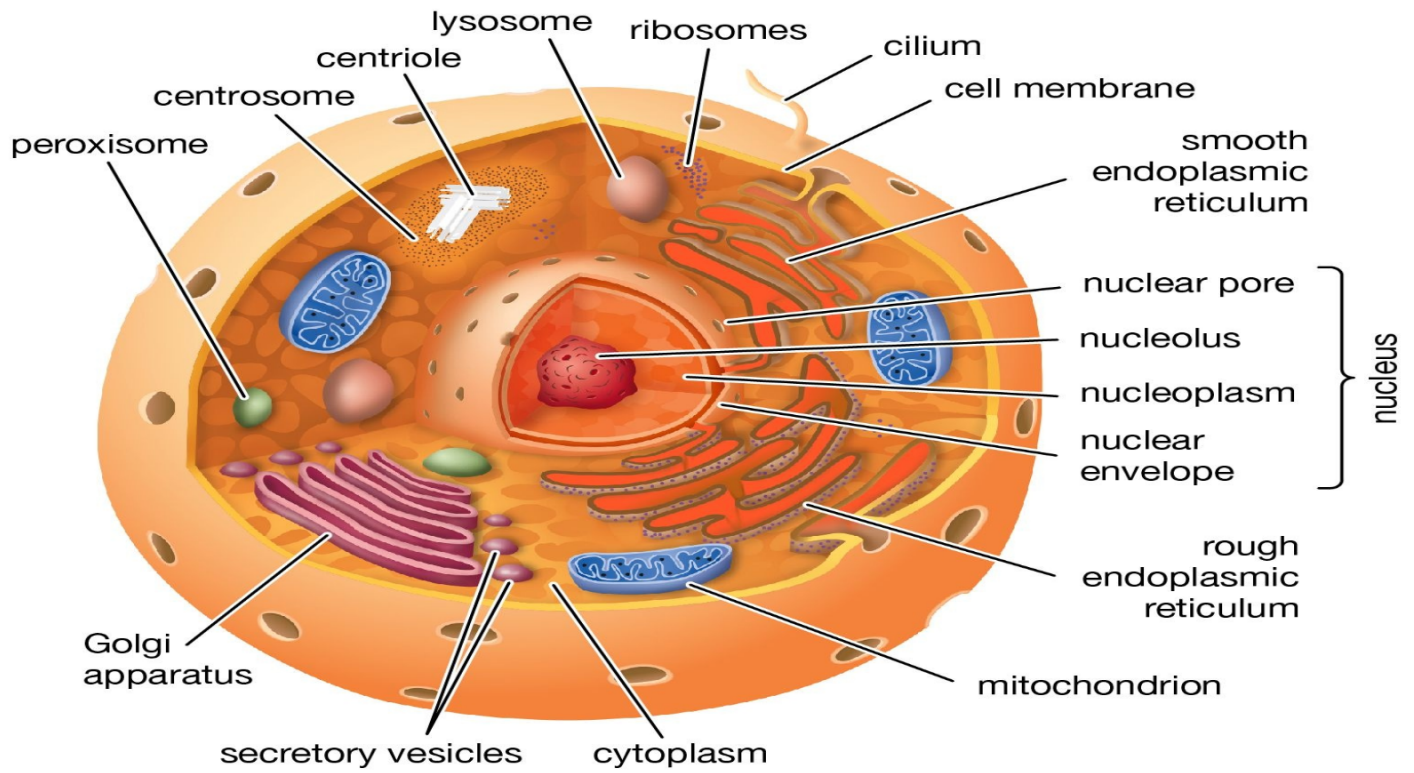
- When the PH of the blood increases, the breathing rate will increase until there is an accumulation of  $CO_2$  which in turn increase the concentration of  $H^+$  in the blood, so that the PH will return to its normal level in the body.

③ When the concentration of calcium decreases:



- Cell Biology:- inside the cell, various compartments (organelles) help maintain distinct environments, allowing different biological processes to occur efficiently. These compartments are separated by membranes that regulate the exchange of molecules.

## Animal cell



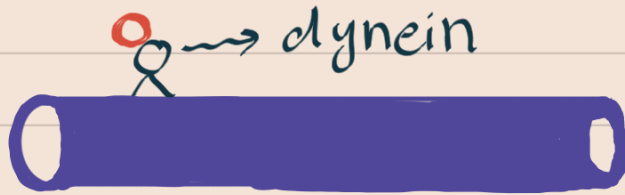
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## General information:-

- 1] Lysosomes need acidic environment unlike other parts.
- 2] Smooth endoplasmic reticulum serves as a calcium storage site for the cell.
- 3] The oxidative phosphorylation occurs in the inner mitochondrial membrane and is a key process for (ATP) production.
- 4] Cytoskeleton:-
  - A] micro filament (actin) (the smallest one) helps in polymerization and depolymerization
  - \* look at dendrites in (Neurons)

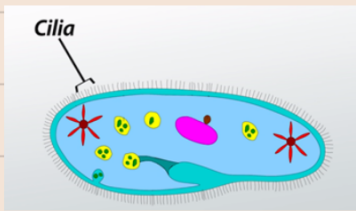
**B** Intermediate filament

**C** Microtubules (the largest one)  
- movement



- Motility by (cilia)

- Spindle formation during cell division.



Good Luck

we will go into more details about each organelle later