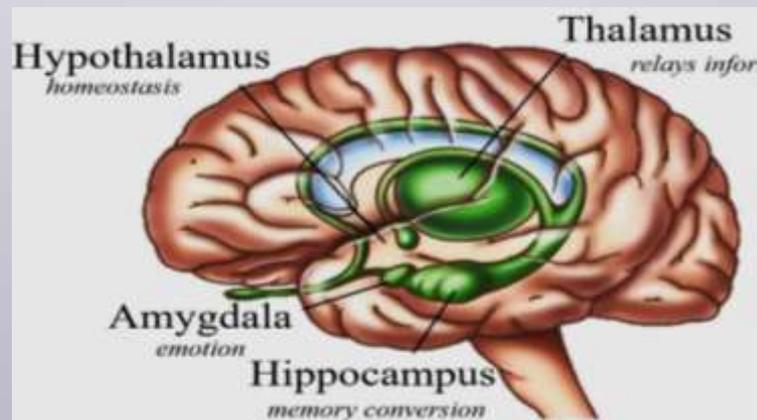




# 5. LIMBIC SYSTEM



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# The limbic system

**Anatomically** the limbic system is the rim of cortical tissues which encircle the corpus callosum and is composed of :-

- 1) Orbital surface of the frontal lobe.
- 2) Subcallosal and cingulate gyrus.
- 3) Para-hippocampal gyrus.
- 4) Uncus and pyriform nucleus.
- 5) Group of associated nuclei as septal nuclei and amygdala.

The limbic system is **characterized** by:

- 1- many interconnections between it's neucli and between these nuclei and the thalamus and hypothalamus. One of the most important of these circuits is "**Papez**" circuit .
- 2- Prolonged after discharge (many reverberating circuits ) .
- 3- Few connection with the cerebral cortex ( neo-cortex ) .

**Physiologically**, the limbic system is that part of the brain which regulate the "vegetative function" of the brain (behavioral function, body temp, osmolality, drive to eat to drink, sexual behavior and olfaction). The hypothalamus is considered physiologically one of the central elements of the system.

# The Limbic System (the basics)



Olfactory bulb – while not an actual part of the limbic system, the limbic system does overlap the entire rhinencephalon, which is why smells trigger feelings and often times associations from the distant past.

# \*The functions of the limbic system:

1-Olfaction, giving specific reactions for specific odour.

2-Behavioral changes which included :

- **Cognition** (awareness of sensation itself and it's cause)

- **Affect** (feeling of sensation whether pleasant on non pleasant)

- **Conation** (urge to take action to interface this sensation with the physical changes which accompanies sensation such as changes in heart rat and blood pressure)

3-Sexual behaviors, including desire and integration of the reflexes which lead to erection, mating, ejaculation.

4-Feeding behavior, which are concerned with "**appetite**" to certain types of food, quality rather than quantity.

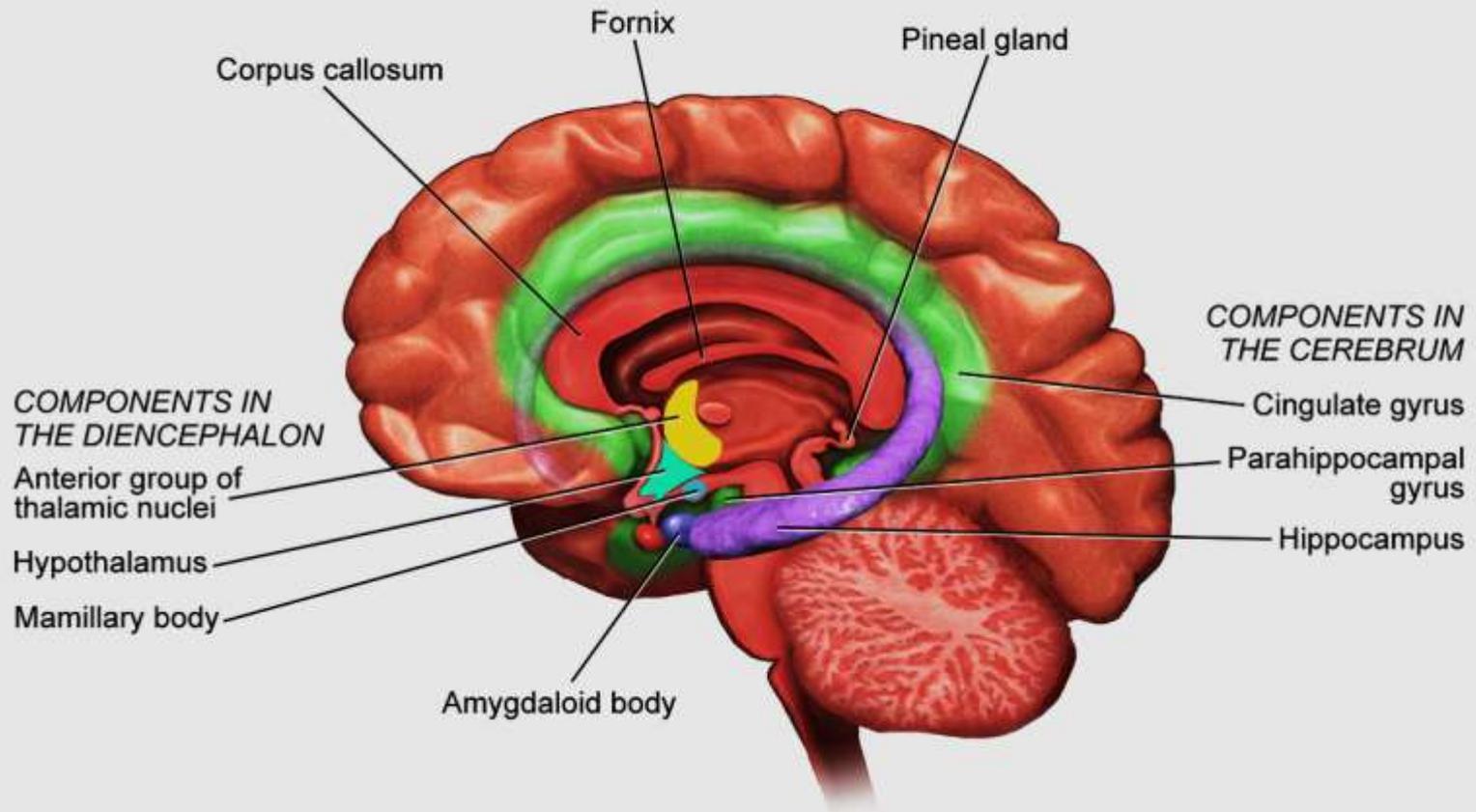
5-Regulation and background to the conditioned reflexes which lead to **learning**.

6-Short acting memory, it is characterized by **reverberating circuits**.

7-Through it's close connection to hypothalamus, limbic system regulate secretion of some hormones especially those which regulate  $\text{Na}^+$  and  $\text{K}^+$  levels in the blood and catecholamines.

8-Regulation of autonomic reactions which accompanies the different sensations.

# The Limbic System



## \*Lesion of the limbic system- "Kluver-Bucy syndrome":

This syndrome occurs due to lesion in limbic system, due to bilateral lesion in the **Amygdaloid** nucleus by vascular or degenerative lesions. It is characterized by:-

- 1) **Loss of fear reaction** : patient may interface a dangerous enemy but he does not behave that this enemy threatens his life.
- 2) **Placidity** (opposite rage reaction) patient losses aggressiveness and it is very difficult to make him angry .
- 3) **Tendency to examine every thing orally** (loose interest to other sensations).
- 4) **Tamness**: inability to be "decision maker" and he does not do any thing except if you tell him to do it .
- 5) **Abnormal sexual drive** which becomes so strong that the animal attempts to do sexual intercourse with immature animals or animals of other sex.
- 6) **Omniphagia** : abnormal feeding behaviors, patient may eat any thing even non food materials as papers or plants, solids .
- 7) **Inability to educate** (mainly due to lesion in hippocampus).
- 8) **Memory disturbance**, forget any recent information.

Thank You