

وسهلا



أهلا

يُمنع أخذ السلايدات بدون  
إذن المحرر واي اجراء  
يخالف ذلك يقع تحت طائلة  
المسؤولية القانونية  
جميع المعلومات للاستخدام  
التعليمي فقط

الأستاذ الدكتور يوسف حسين

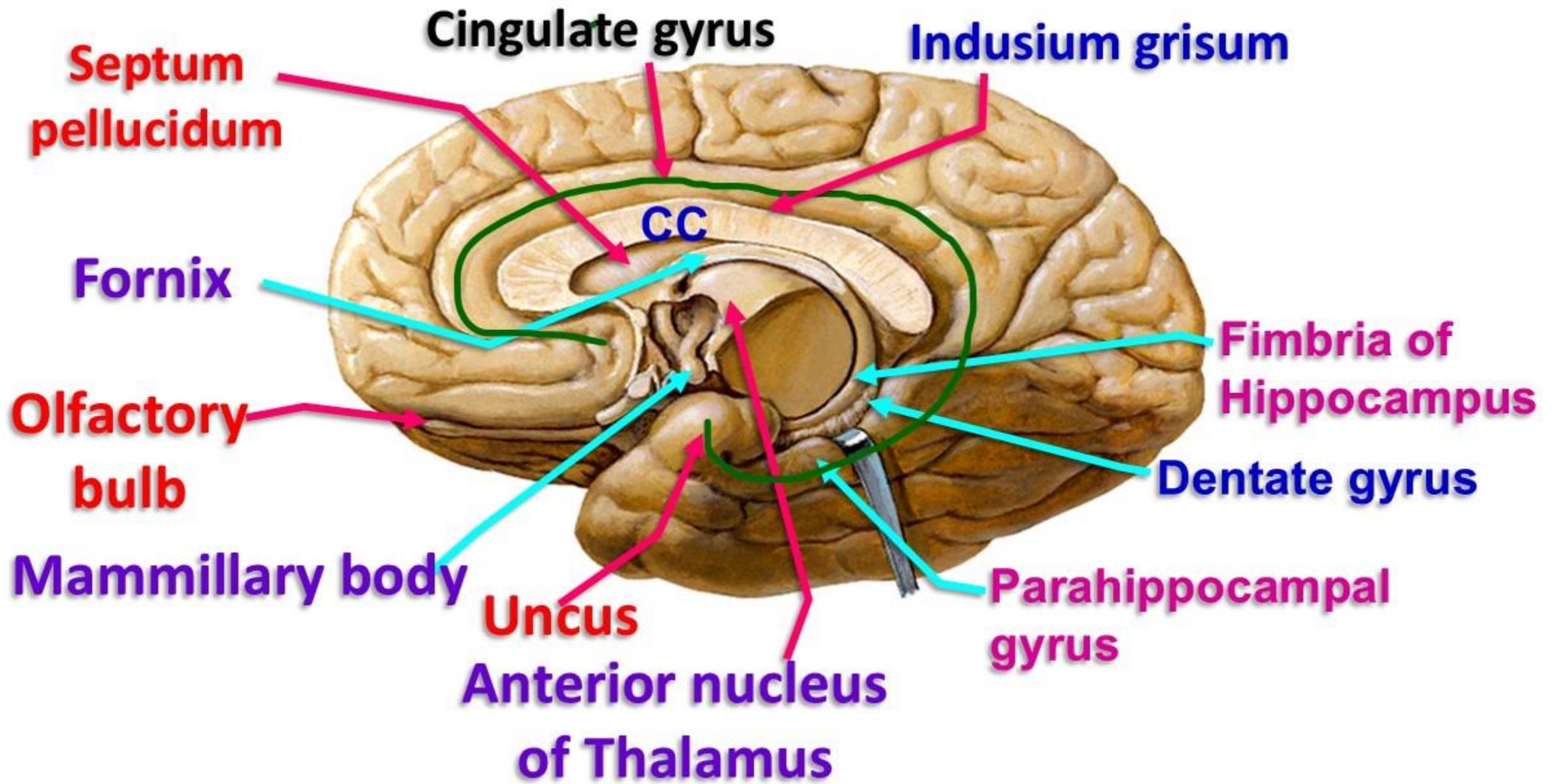
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دكتورة من جامعة كولونيا المانيا

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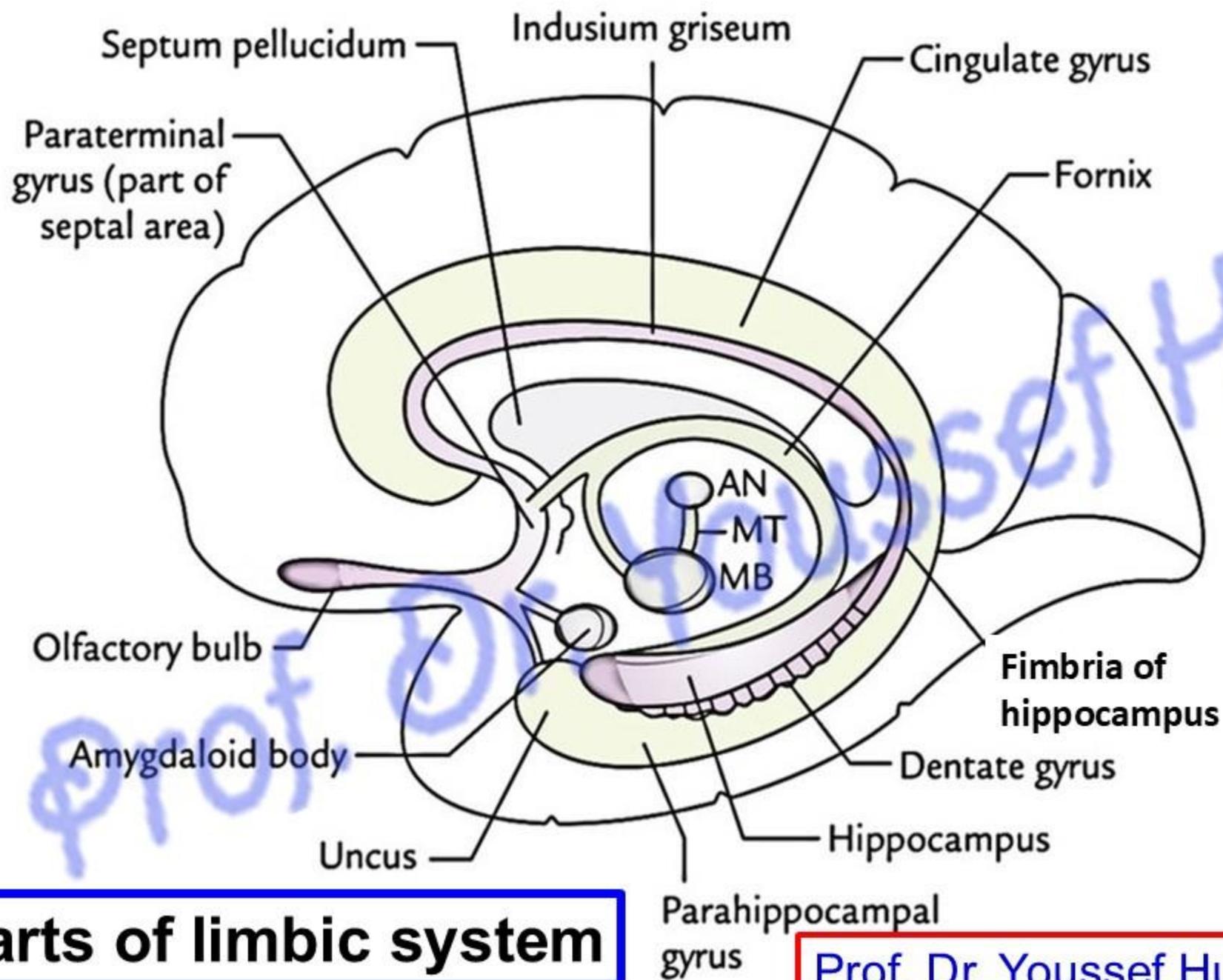
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# Limbic System



**Parts of limbic system**

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**Parts of limbic system**

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## Parts of limbic system

- The name applied to the number cortical and subcortical structures in the form of an arch (limbus) known as **circle of Papez**.
- **Cingulum (association fiber):** from **frontal** lobe just below the rostrum of corpus callosum → extends backwards in the cingulate gyrus → curves in the isthmus → passes forwards in the parahippocampal gyrus → ends in the **uncus**.
- **Indusium griseum**, Thin gray matter covers superior surface of corpus callosum.
- **Septum pellucidum and septal nuclei**, thin sheet of white matter between fornix and corpus callosum.
- **Mamillothalamic tract (MT)** from **mammillary body of hypothalamus** to **anterior nucleus of thalamus**.
- **Fornix**
- **Amygdaloid body**
- **Hippocampus**
- **Olfactory pathway**

## • Functions of Limbic System

▪ It involved in processing

➤ Memory and attention

➤ Emotional response including feelings of happiness, fear, anger, and anxiety. الاستجابة العاطفية بما في ذلك مشاعر السعادة والخوف والغضب والقلق

➤ Behavior السلوك

➤ Feeding (satiety & hunger) التغذية (الشبع والجوع)

➤ Maternal instincts as caring for our young غرائز الأمومة مثل رعاية صغارها

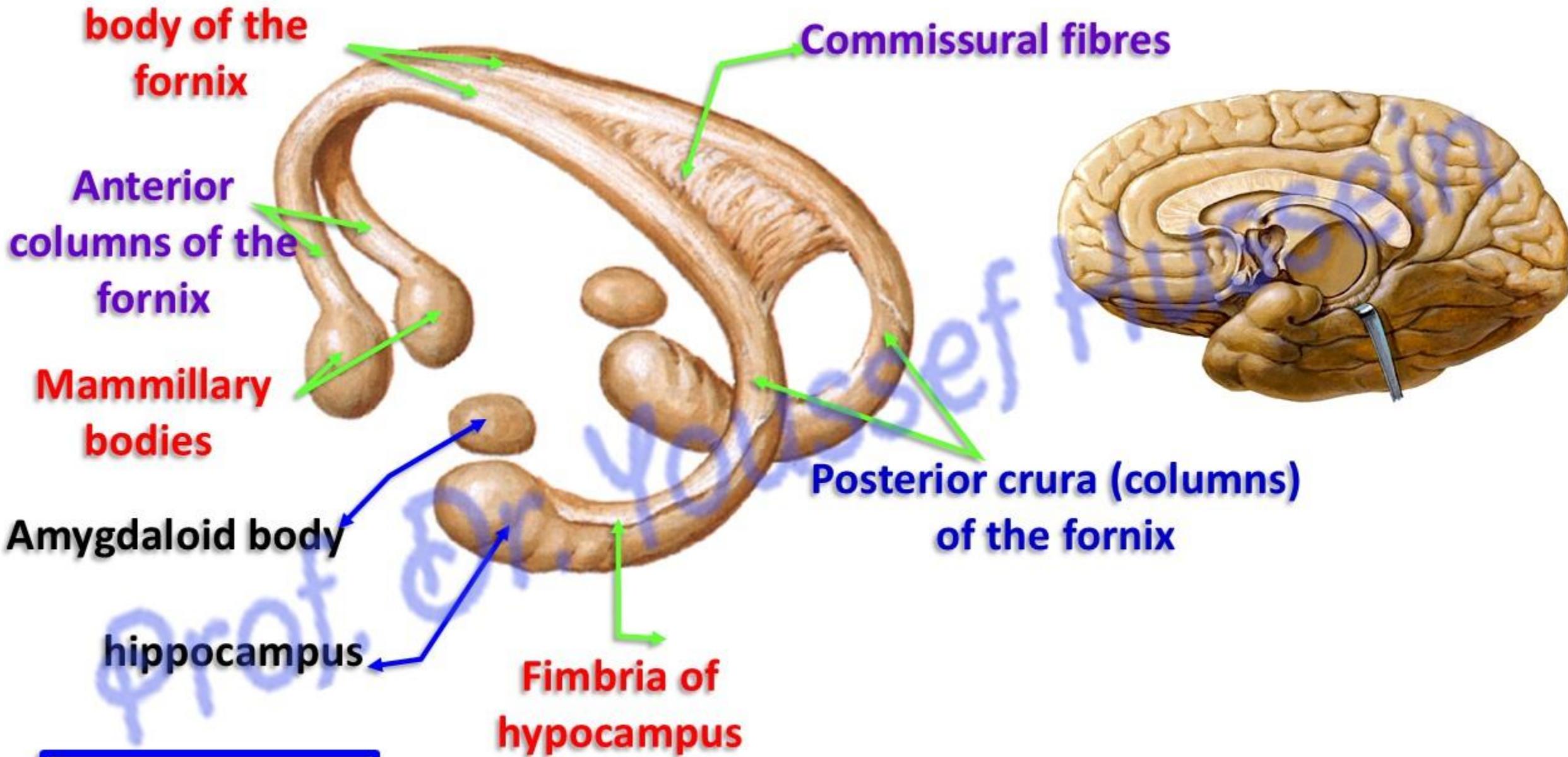
➤ Sex

➤ Responsible for olfactory related stimuli

(a person may be vomit or salivate when smell a certain odor)

مسؤول عن المنبهات الشمية (قد يتقيأ الشخص أو يسيل لعابه عند شم رائحة معينة)

# Fornix



**The fornix**

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## Fornix

- The fornix is the **Efferent** system of the hippocampus.
- It forms a part of the **limbic system**.
- **Structure**; It is formed.

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### 1- Two Posterior columns (Crurae);

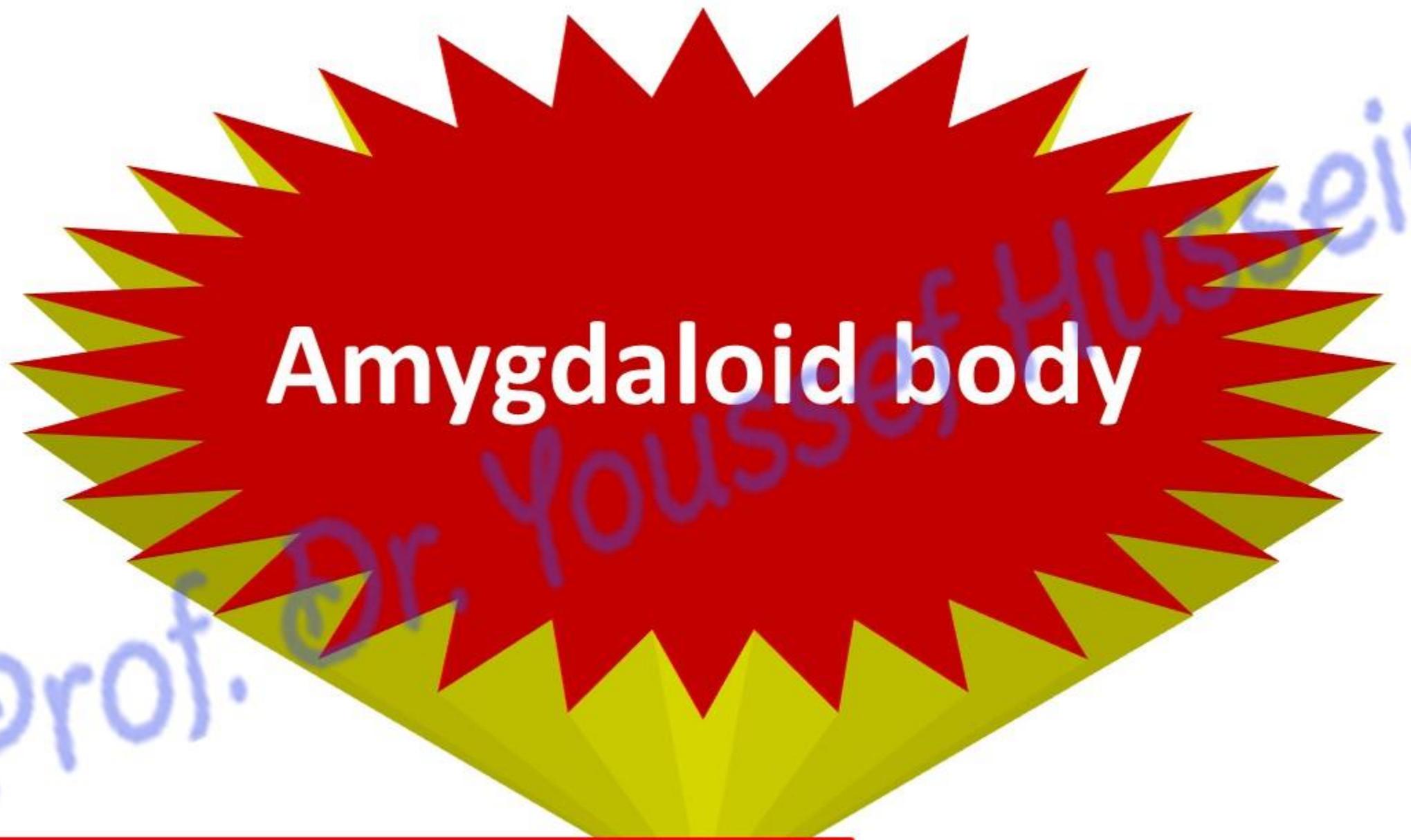
- Each crus is the continuation fibers of the fimbria of the hippocampus.
- They connected together by commissural fibers
- They come together in the median plane to form the body.

### 2- Body; triangular in shape, with narrow anterior and broad posterior.

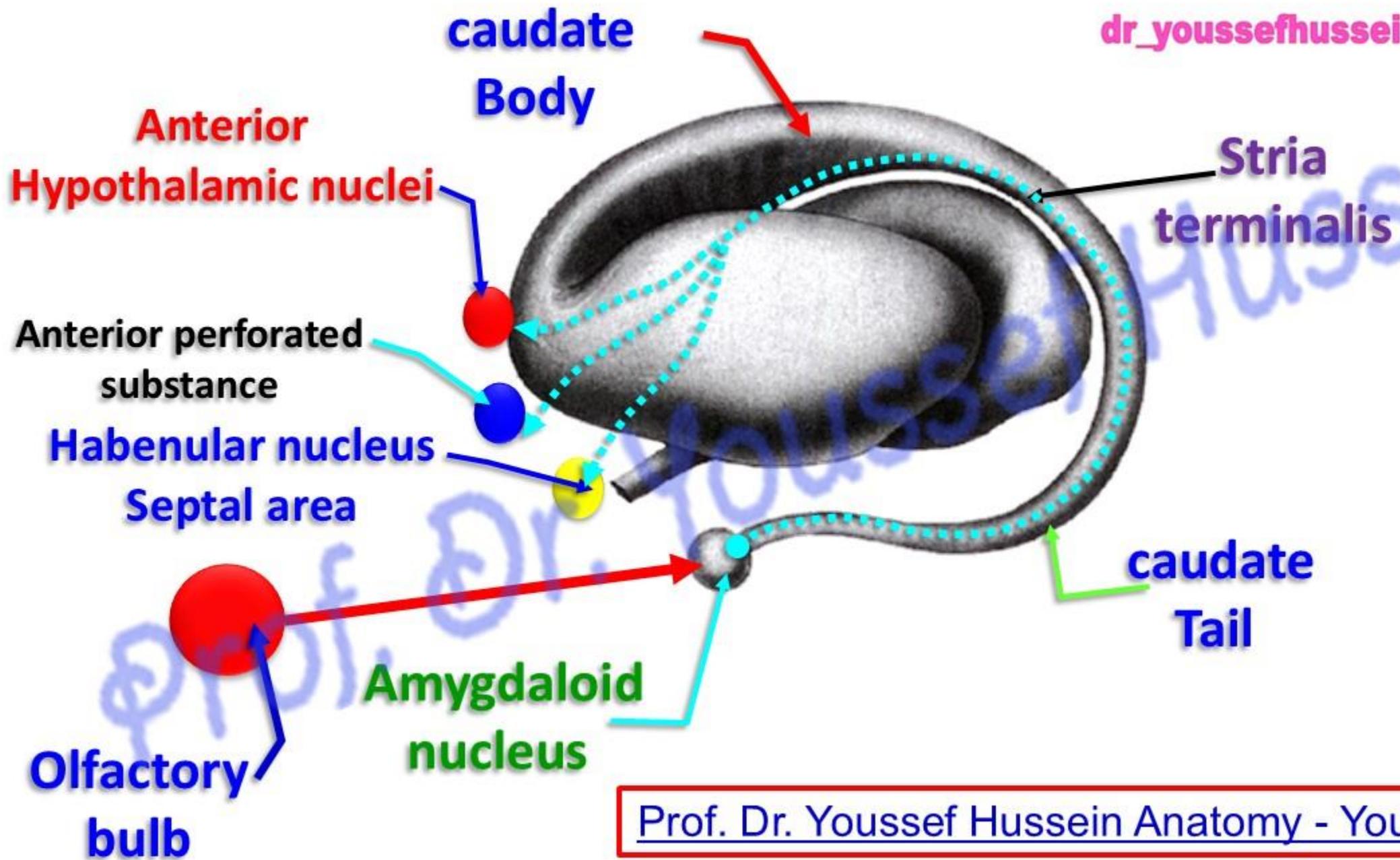
- **Upper surface** is connected with lower surface of corpus callosum by **septum pellucidum**.
- **Lower surface** rests on upper surface of the 2 thalami and roof of the 3rd ventricle.

3- Two anterior columns; end a) **Mammillary body** (**hypothalamus**) through mammillothalamic tract to anterior nucleus of thalamus to cingulate gyrus .

### b) Septal area, and orbital cortex



# Amygdaloid body



## 4- Amygdaloid Body لوزة المخ

- It joins to the tail of caudate nucleus.
- **It is situated in medial part of the temporal pole close to the uncus**

\*\* **Afferent**; from the olfactory bulb.

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\*\* **Efferent**; *Stria terminalis* accompanies the medial edge of caudate nucleus (**LIMBIC SYSTEM**) to anterior hypothalamic nuclei , anterior perforating substance and habenular nucleus of the epithalamus

### ▪ **Functions:**

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- It is part of the olfactory and **limbic systems**
- It plays a role in smell, motivation, emotional behavior (fear, anxiety, anger, aggression, pleasure, and fear memory)
- Amygdaloid has 3 functions (olfaction, sexual excitement and recent memory).

## **\*\* Functions of the Hypothalamus**

- 1- Endocrine control** by formation of releasing stimulating factors or releasing-inhibiting factors that control the hormones of the anterior lobe of the pituitary gland.
- 2- Neuro-secretion** to the posterior lobe of the pituitary gland;
  - a- Vasopressin** causes reabsorption of water by the kidney and its deficiency leads to diabetes insipidus.
  - b- Oxytocin** causes contraction of mammary gland and uterine muscles.
- 3- Control of the autonomic nervous system.**
- 4- Regulation of body temperature:**
- 5- Regulation of food and fluid intake.**
- 6- Sexual behavior and reproduction.**
- 7- Biological clocks** (sleep and wakefulness).

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# Hippocampal Formation

## Fimbria of Hippocampus

# HIPPOCAMPUS

Fornix

Mammillary  
body

Uncus

Dentate gyrus



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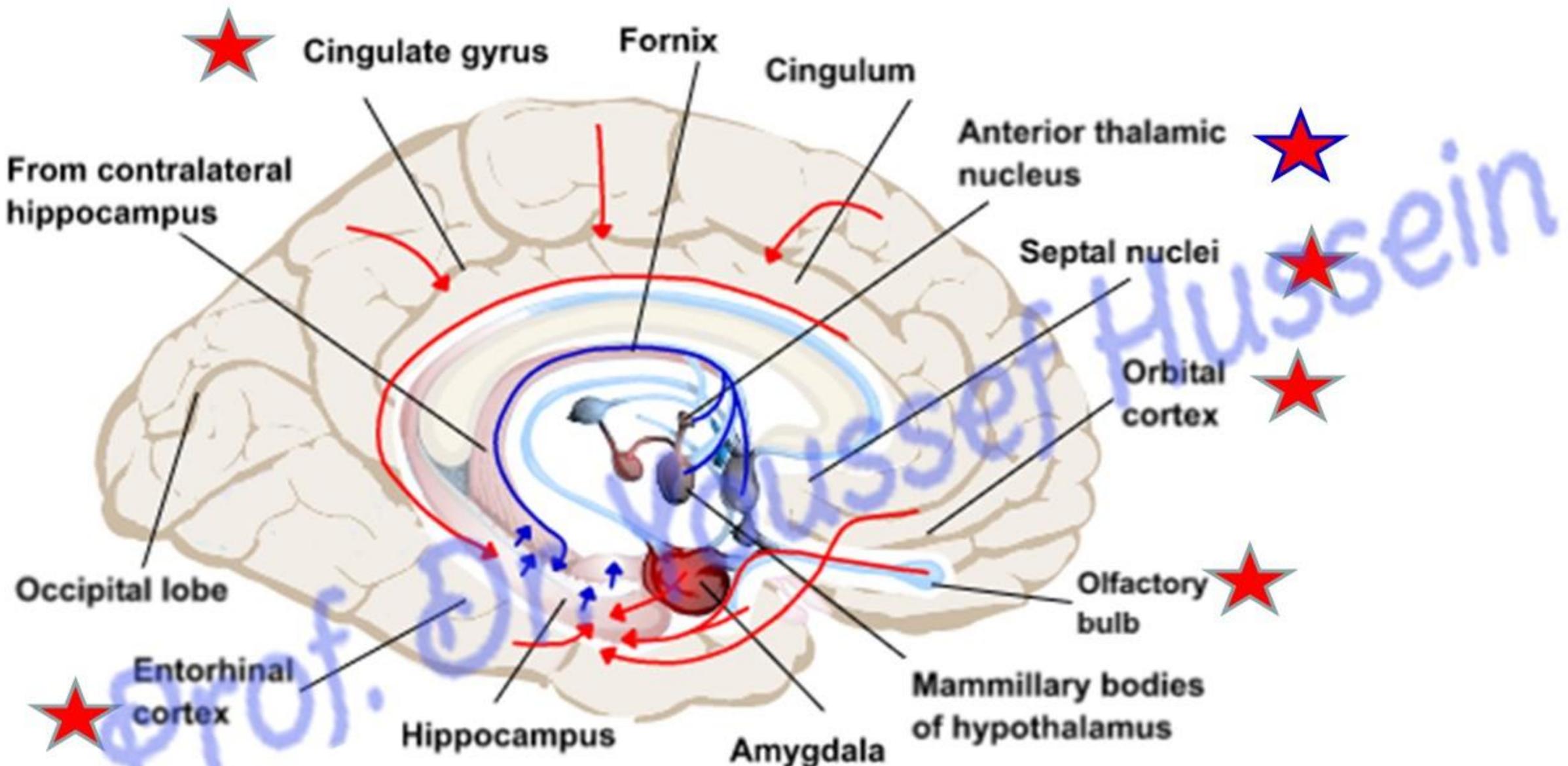
- **A hippocampal formation (Hippocampus and dentate gyrus)** is located in **temporal lobe (medial)** of each cerebral cortex, medial to the inferior horn of the lateral ventricle.

## Hippocampal formation

- It contains two main parts, Hippocampus and dentate gyrus (below the fimbria, it has a toothed surface), **Hippocampus is a center of Emotion and Memory**
  - **Hippocampus** الحصين
- It is called seahorse فرس البحر or **Cornu Ammonis**, قرن أمون
- Its abbreviation CA (CA1,CA2,CA3)
- Its anterior end broad and continues with the **uncus**.
- Its posterior end is narrow, a thin film of white mater called **alveolus** (axons of hippocampal cells).
- The fibers of alveolus thicken to form **fimbria of hippocampus**

## Efferent (Output) of Hippocampus

- **Fimbria (Efferent - Output)** which are continuous posteriorly with the **fornix** that ends in
- **Mammillary body (hypothalamus)** through mammillothalamic tract to anterior nucleus of thalamus to cingulate gyrus .
  - **Septal area, and orbital cortex**



**Afferent of hippocampus**

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## Afferent (Input) of Hippocampus

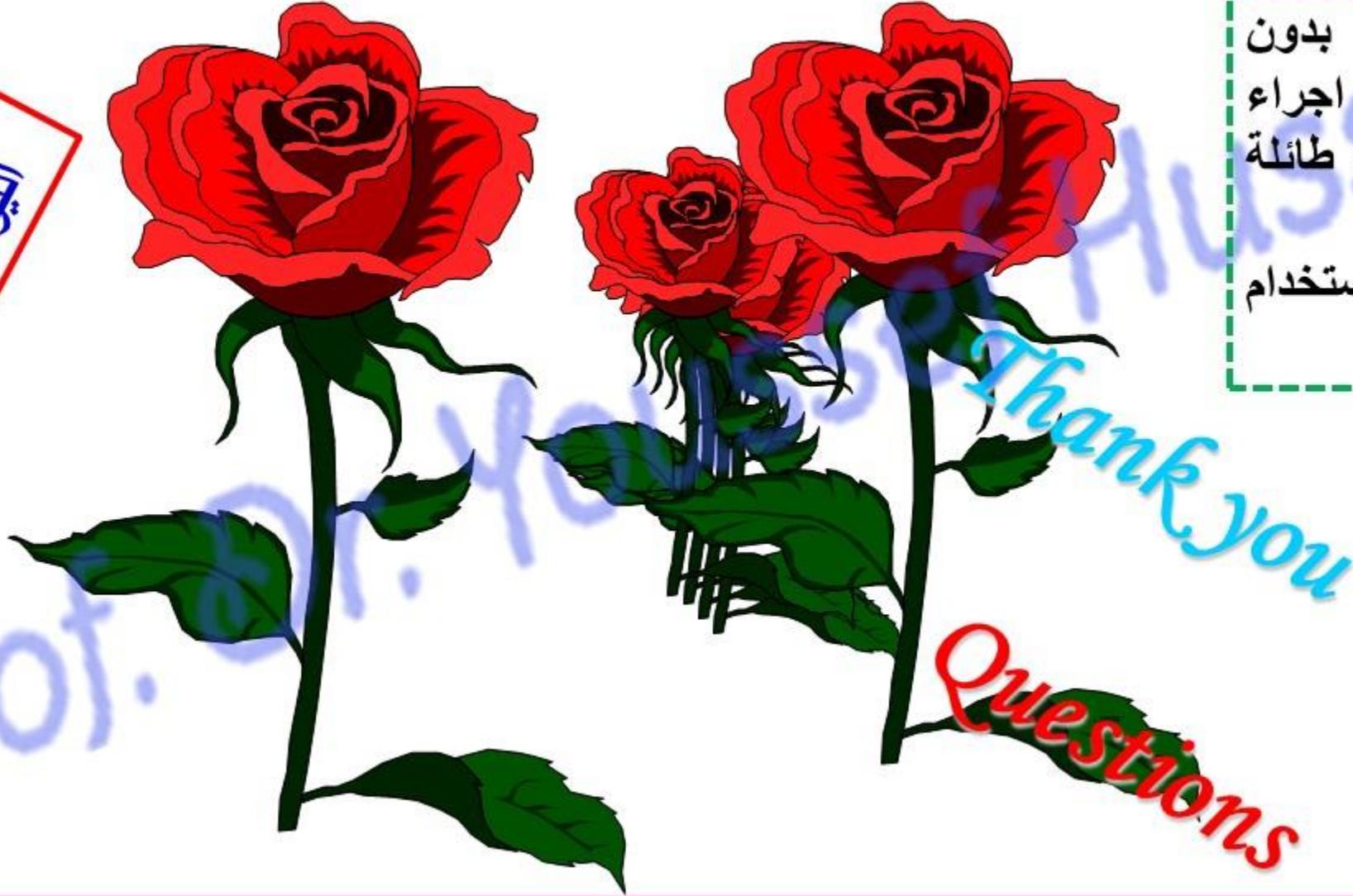
- **1- Entorhinal cortex** of parahippocampal gyrus is a major source of inputs to the hippocampus via the axons called perforant path → dentate gyrus → CA3-to-CA1 (**Trisynaptic circuit**)
- **2- Amygdala**
- **3- Olfactory bulb**
- **4- Orbital cortex**
- **5- Cingulate cortex**
- **6- Thalamus (anterior nucleus)**
- **7- Hypothalamus (Mammillary body)**
- **8- Septal nuclei**
- **9- Temporal lobe cortex**
- **10- Cerebellum (fastigial nucleus)**

It is important to remember that afferents and efferents of the hippocampus are bundled together in the same paths.

[https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd\\_cn0PQ](https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd_cn0PQ)

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