

LIMBIC SYSTEM

COMPONENTS OF LIMBIC SYSTEM :

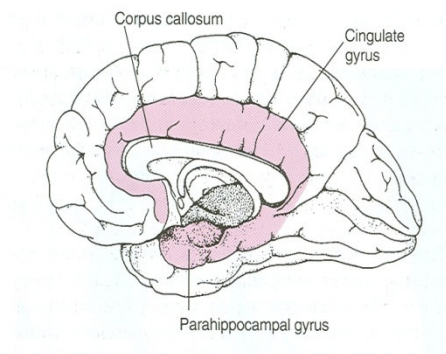
1. Limbic lobe.
2. Hippocampal formation.
3. Amygdala.
4. Septum.
5. Some thalamic nuclei (mainly anterior).
6. Hypothalamus (especially mamillary bodies).
7. Habenular nuclei.
8. Interconnecting fibers.

FUNCTION OF LIMBIC SYSTEM :

- It is concerned with memory and with visceral and motor responses involved in defense and reproduction.

LIMBIC LOBE :

- The ring of **grey matter** on the medial aspect of each cerebral hemisphere, surrounding the corpus callosum.
- It includes : the **cingulate gyrus** & the **parahippocampal gyrus**.



HIPPOCAMPAL FORMATION :

- It consists of :
 1. **Hippocampus.**
 2. **Dentate gyrus** : lies between hippocampus & parahippocampal gyrus.
 3. **Most of parahippocampal gyrus.**

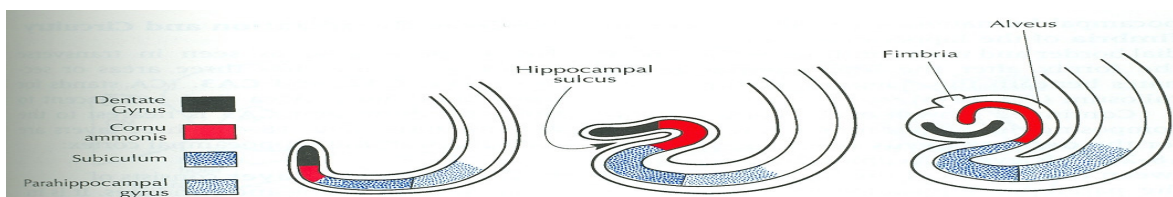


Figure 18-1. Stages in the embryonic development of the hippocampal formation at the margin of the pallium, showing how the external surfaces of the dentate gyrus and cornu ammonis become fused as a result of growth and folding.

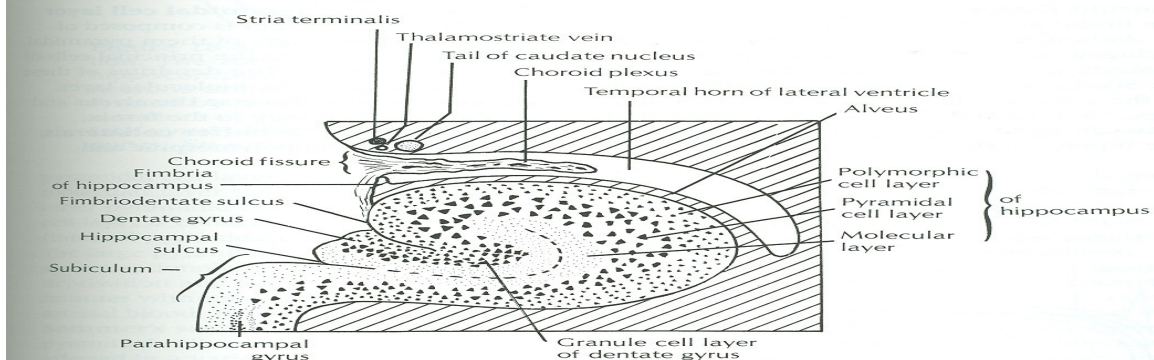
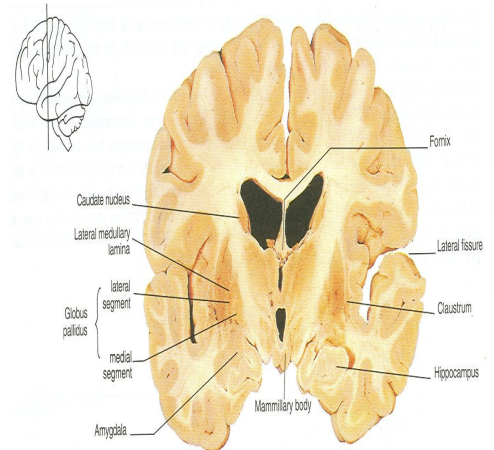
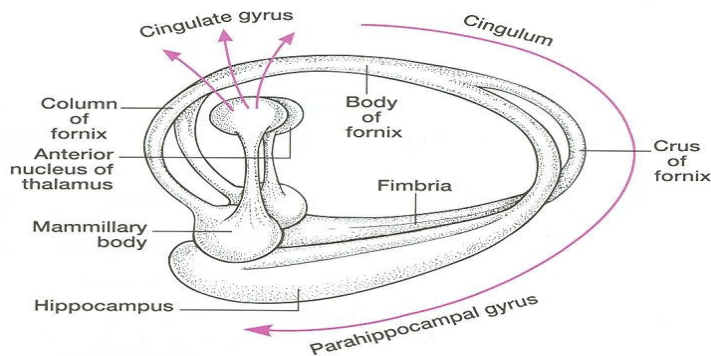


Figure 18-2. Simplified coronal section through the hippocampal formation (medial surface at the left).

THE HIPPOCAMPUS :

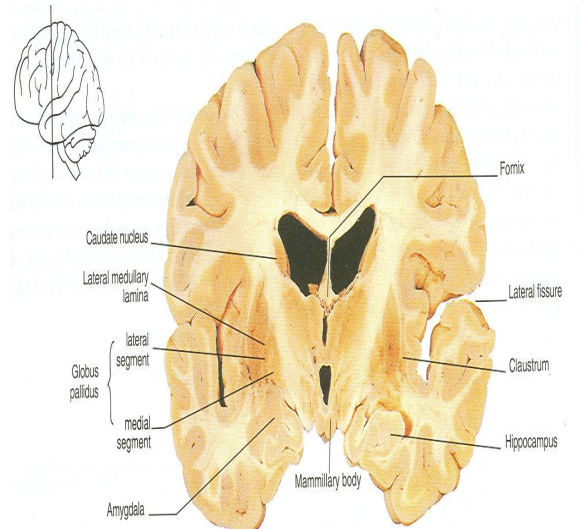
- It is formed by infolding of the inferomedial part of temporal lobe into the lateral ventricle.
- Its principal efferent pathway is called **THE FORNIX** :
a C-shaped group of fibers connecting it with mamillary body, it consists of : **fimbria, crus, body & column**.
- It is an important component of **PAPEZ CIRCUIT**.



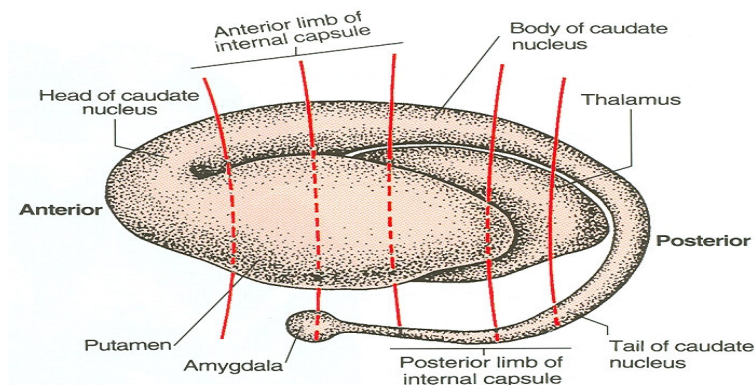
- **Function of Hippocampus :**
 - The hippocampus & its connections are necessary for consolidation of new short-term memories.
 - When the hippocampi or the circuit of Papez are no longer functional, memories of earlier events are retained.

AMYGDALA :

- Site : It lies in the temporal lobe (near the temporal pole), between the inferior horn of lateral ventricle and lentiform nucleus.

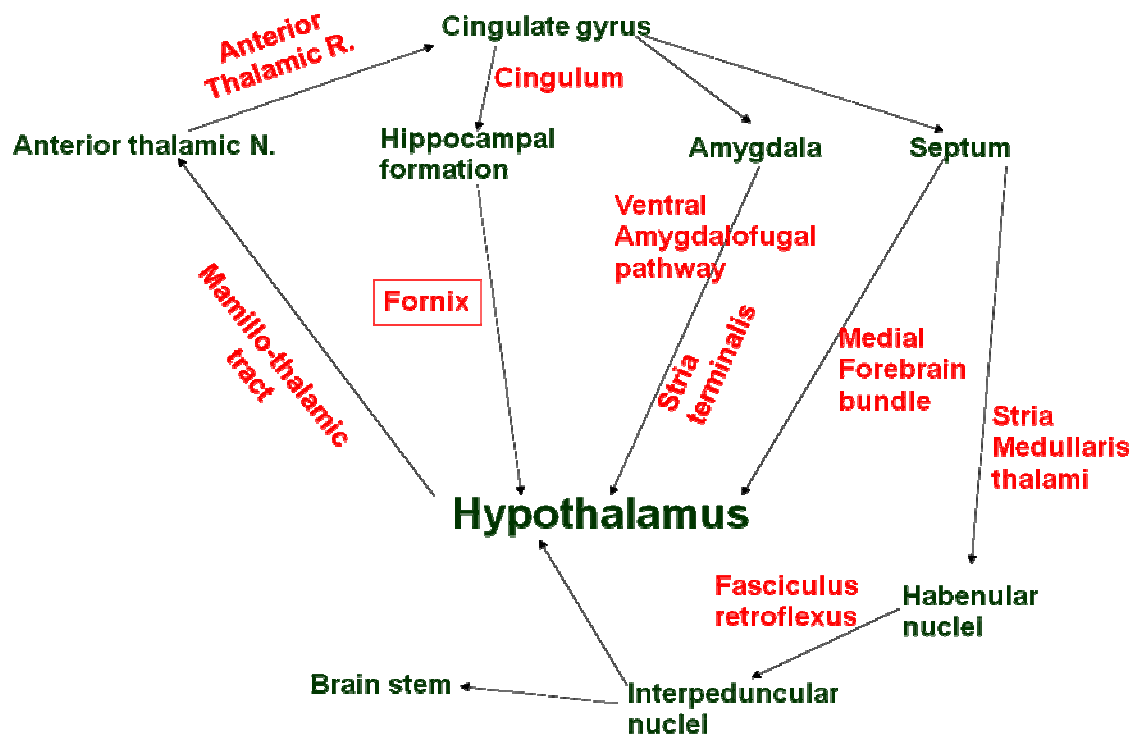


- **Function of Amygdala :**
 - it is the part of limbic system concerned with emotional and behavioral functions.
 - It is responsible for strong affective reactions as fear & anger and emotions associated with sexual behavior.
- Lesion : lack of emotional responses, docility.



SEPTUM :

- Site : beneath the rostral part of corpus callosum.
- Main connections :
 1. To hypothalamus through **medial forebrain bundle**.
 2. To habenular nuclei through **stria medullaris thalami**.



LESIONS ASSOCIATED WITH LIMBIC LOBE DISORDERS :

1. Korsakoff's psychosis.
2. Temporal lobe epilepsy.
3. Alzheimer's disease.
4. Schizophrenia.

THE END



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NOTES

- The amygdala is located near to the temporal pole. It receives projections from the olfactory system and the temporal cortex, and has reciprocal connections with the septum.
- The hippocampal formation is made up of the hippocampus, dentate gyrus and parahippocampal gyrus of the temporal lobe. It receives fibres from the entorhinal cortex and projects via the fornix to the mammillary body of the hypothalamus.
- The principal components of the limbic system are interconnected in the Papez circuit.

SELF QUIZ

- 1. Regarding the Limbic system, all of the following is true EXCEPT :**
 - a. Amygdala is one of limbic system components.
 - b. Most of Parahippocampal gyrus share in Hippocampal formation.
 - c. Between hippocampus & parahippocampal gyrus there is Dentate gyrus.
 - d. The limbic lobe includes hippocampus & parahippocampal gyrus.
 - e. The corpus callosum surrounded by cingulate gyrus & parahippocampal gyrus.
- 2. Regarding the Limbic system, all of the following is false EXCEPT :**
 - a. Septum has connection with hypothalamus through stria medullaris thalami.
 - b. Damage of amygdala result in submissive behavior.
 - c. The fornix is the principal afferent pathway for the hippocampus.
 - d. In non-functional Papez circuit, there is loss of earlier events memories.
 - e. The hippocampus is concerned with emotions.
- 3. All of the following are associated with limbic lobe disorders EXCEPT :**
 - a. Dementia.
 - b. Hallucination.
 - c. Paranoid.
 - d. Tremor.
 - e. Epilepsy.

1. d	2. b	3. d
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