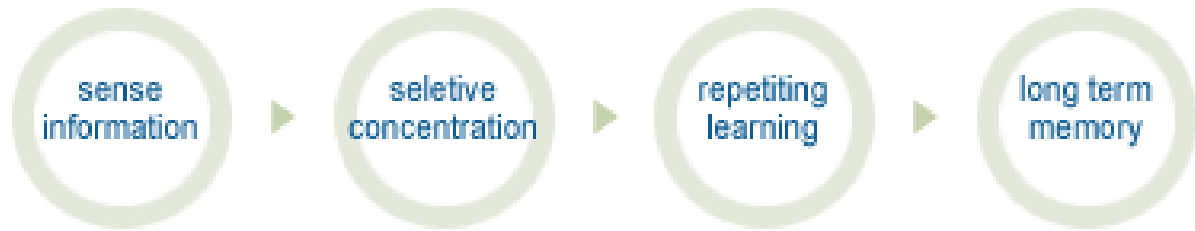


Brain waves and memory process



1. What are brain waves?

The brain waves are signals that occur on the brain surface. These waves occur as a result of an ion penetrating through the cell membrane of an excited neuron. To observe the brain waves, the volatge of EEG (electroencephalography) has to be amplified to its millionth power with an electrode placed on the brain surface. In this case, the brain states can be understood indirectly by measuring the variations in the brain waves.

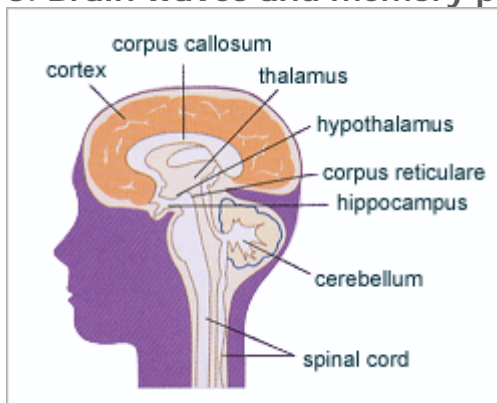
Brain waves	Frequeuncy	Brain activity conditions
Beta	13~30 Hz	All conscious states including the states of acting and speaking.
Alpha	8~12 Hz	Relaxed, meditative, and closed-eyed states.
Theta	4~7 Hz	Creative, studious, and relaxed states.
Delta	1~3 Hz	Deep sleep state

2. Brain waves and Concentration

When outer stimulations occur, corpus reticulare activates and averts conscious point and effects of blocking alpha are appeared. In contrast, thalamus system expands alpha to wide range and internalizes conscious point to control concentration and interests.

- Delay in development of thalamus system, preponderance of corpus reticulare appears, which leads to excessive behavior of children.
- Literature cited : Modern psychiatry by Dong-keun Shin, Kwang-yoon Su, and Byung-yoon Lee, 1993

3. Brain waves and memory process



As brain is processing semantic memory operation, memorizing and grasping simple meaning of a word, disconformable effect of alpha occurs and episodic momory referring to one's own experience processes and alpha decreases and theta of hippocampus increases. When hippocampus translates new information and combines this with prior information, genuine theta is released. Also through activation of nerve joint(LPT) hippocampus induces long term memory process or strengthens it.

- If hippocampus is removed, past information can be remembered but not the story a person just talked about.
 - Literature cited : Memory-brain, Klimesch, 1995
- Episodic and semantic memory: an analysis in the EEG theta and alpha band, W. Klimesch, H. Schimke and J. Schwaiger, 1994