

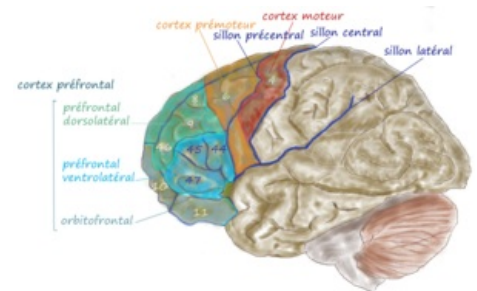
Neurobiology

Normal Human Behavior

- Manifestation of the function of brain systems that will allow speech, perception, memory, attention, emotions, etc.
- Dynamic circuits are created that are highly adaptable and capable of being influenced by modulator and feedback functions.
- **The most affected systems in psychological disorders** – prefrontal system, limbic system, BG, memory and speech system.

Prefrontal system

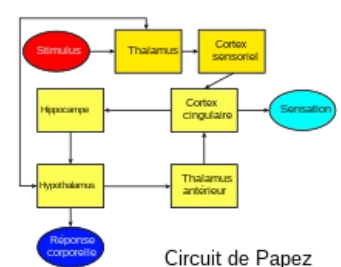
- One of the largest cortical areas of the human brain (about 29%).
- **Function** – integration of information into various sources, planning, decision-making, new ideas and ideas.
- Connections from the whole brain, mainly with rostral thalam (ncl. mediodorsalis), connection with ncl. mediodorsalis thalami.
- **Magnocellular component** – Into the orbital and medial parts of the prefrontal cortex.
 - Lesions – *euphoria, hyperkinesia, inappropriate social behavior.*
- **Parvocellular component** – Into the dorsolateral parts of the prefrontal cortex.
 - Lesions – *apathy, hypokinesia, cognitive disorders*
- Connection with visual, auditory, olfactory etc. cortex integration of sensory perceptions.
- Direct two-way connection with the limbic system – integration of learning and memory.
 - The only cortical region that sends direct projections to the hypothalamus and septal regions → leading role in the **regulation of the limbic system**.
 - Various specifically human functions – *abstract thinking, creativity, social relations, responsibility, attention, perception, movement, time integration, emotions.*
 - Lesions – *Decreased alertness, negligence, absent-mindedness, visual attention disturbances, visual disturbances, difficulty concentrating, hyper or hypokinesia (depending on the location of the lesion), difficulty planning, poor speech organization, memory impairment.*
 - *Apathetic syndrome* – Dorsolateral lesions.
 - *Euphoric syndrome* – Orbitomedial lesions.



The prefrontal cortex and its parts are represented by shades of blue color.

Limbic system

- A ring of brain tissue that lines the prefrontal, parietal and occipital neocortex in the median plane.
- Connection with the olfactory cortex – formerly called rhinencephalon.
- James Papez – (another function – Papez circuit) thought that the entrance is not the olfactory nerve, but the input from the neocortex is through the Cingulate gyrus into the hippocampus, amygdala and mammillary body and anterior thalamus.
- The main function – **Experiencing experiences and regulating emotions.**



Circuit de Papez

Papez circuit

Hippocampus

- *It is the memory storage center.*
- **Temporal epilepsy** – Various psychopathological phenomena – depersonalization, olfactory and taste hallucinations, also increased psychoses, repeated motor acts, often quite complex.
- Hippocampal function – the main role – **learning and memory**. In procedural memory (movements) can not do without cerebellum.
- Lesions – *anterograde amnesia, Korsakoff's psychosis* – amnesia and fading bb. in corpora mammillaria and ncl. mediodorsalis thalami.



Hippocampus

Amygdala

- **Nuclei** – Subnucleus – centralis (C), medialis (M) (C and M autonomic function), corticalis (Co) (smell), lateralis (L), basalis (BL, BM).
- Basolateral subnuclei – Consciousness.
- Stimulation of C-M – **Salivation, muttering, licking, chewing, defecation, micturition, inhibition of voluntary movements, anger.**
- B-L stimulation – **Awakening, attention increase, mydriasis, fear, rage.**

- Sexuality.

Basal ganglia

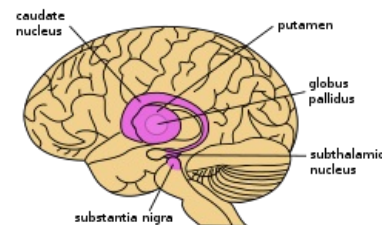
- Primarily objective – **Motor skills**.
- They also play a big role in **the expression and regulation of emotions**.
- Some syndromes from this area manifest psychiatric symptoms.
 - Huntington's disease (atrophy of ncl. caudatus) – Common delusions, depression, impulsive behavior, dementia.
 - Parkinson's disease – Symptoms similar to negative symptoms in schizophrenia, also dementia.
- Within the striatum we can find many D2 receptors – the place of action of antipsychotics – suppresses positive symptoms (hallucinations and delusions).



Amygdala

Language and speech system

- The system is almost exclusively localized in the left hemisphere.
- 19th century – Broca and Wernicke.
- Crawl's **Broca's centers** – Stuttering, stuttering and agramtic speech.
- **Wernicke Center** – "Suditory association cortex", a matrix of words – the signal comes to the auditory region, but must be compared with the matrices to understand this.
- Understanding of the written – visual association cortex – gyrus angularis.



Basal Ganglia

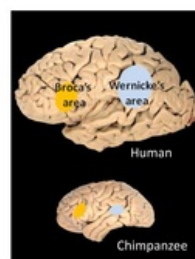
Links

External links

- Neurobiology (English wikipedia)
- Neuroscience

Source

- BENEŠ, Jiří. *Studijní materiály* [online]. [cit. 16.02.2010]. <<http://jirben.wz.cz>>.



Broca's and Wernicke's areas

Category:Psychiatry Category:Neurology