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Functions and Clinical Significance of Cerebral Cortex

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Short Communication

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DESCRIPTION

The cerebral cortex is connected to various subcortical structures such as the thalamus and the basal ganglia, sending information to them along efferent connections and receiving information from them *via* afferent connections. The thalamus is the main pathway via which sensory information travels to the cerebral cortex. However, olfactory information travels from the olfactory bulb to the olfactory cortex (piriform cortex) via the olfactory bulb. According to Braitenberg and Schüz up to 20% of the synapses in primary sensory areas, at the cortical level where the input fibres terminate that are supplied by extracortical afferents, but that percentage is likely to be much lower in other areas and other layers of the cortex. The majority of connections are between areas of the cortex rather than from subcortical areas.

An atrophy of the cerebral cortex's grey matter serves as a sign for neurodegenerative disorders like Alzheimer's disease. Neurological conditions include epilepsy, mobility abnormalities, and various forms of aphasia (difficulties in speech expression or comprehension) are among the other diseases of the central nervous system. A specific lobe may be damaged by disease or trauma, as in frontal lobe disorder, and related functions may also be impacted. Pathogens can enter the brain when the blood-brain barrier, which helps to protect it from infection, is breached.

Clinical significance

The cerebral cortex, the brain's outer layer, is linked to higher order cognitive functions as consciousness, thought, emotion, reasoning, language, and memory. There are four lobes in each cerebral hemisphere, each of which has a specific purpose. Nearly all of the brain's activities depend on the cerebral cortex. Numerous emotional, sensory, and cognitive issues may result from damage to it. The cerebral cortex, or grey matter, of our brain is involved in both Alzheimer's disease and frontotemporal dementia. This indicates that they affect memory and communication at a higher level of the brain and may eventually result in physical symptoms. Dementia has no known treatment and frequently results in death. These data show that cortical thinning starts around middle age and affects a wide range of cortical regions, including both primary and association cortex. About 80% of the brain's bulk is made up of the cerebral cortex, which is also in charge of numerous intricate functions like perception, cognition, language, attention, and memory.

Functions of cerebral cortex

Cortical areas : An early presentation by Korbinian Brodmann split the entire cerebral cortex into 52 distinct regions. Based on their cytoarchitecture, these regions also referred to as Brodmann areas relate to a variety of activities. The primary visual brain, Brodmann area 17, serves as an illustration. The sensory, motor, and association areas are often used to characterise the cortex in a more generic sense.

Sensory areas **:** The cortical regions known as the sensory areas are where information from the senses is received and processed. Primary sensory areas are regions of the cortex that the thalamus sends sensory information to. The primary visual cortex, primary auditory cortex, and primary somatosensory cortex, in that order, support the senses of sight, hearing, and touch. The two hemispheres often receive information from the body's opposing (contralateral) side. For instance, information from the left limbs is sent to the right main somatosensory cortex, and information from the left visual field is sent to the right visual cortex. A topographic map is created when the organization of the sensory maps in the cortex matches that of the corresponding sense organ.

Motor areas **:** Both of the cortex's hemispheres contain the motor regions. The control of voluntary movements, particularly small, fragmented movements made by the hand, is directly tied to the motor regions. The left side of the body is controlled by the motor region's right half, and vice versa. Basal ganglia (or nuclei) are interconnected subcortical grey matter masses found just below the cerebral cortex. The motor areas of the cerebral cortex and the substantia nigra of the midbrain provide input to the basal ganglia, which then sends signals back to both of these regions. They assist with motor control. They can be discovered next to the thalamus on the side.

REFERENCES

1. Hadidchi S. A shift from adaptive to innate immunity: A potential mechanism of disease progression in Multiple Sclerosis. J Neurol.2009;285: 9-11.

2. Vargo M, et al. Immunological decision-making: How does the immune system decide to mount a helper T-cell response? Immunology.2018;121:321-338.

3. Youssef G, et al. T cell receptor signalling in the control of regulatory T cell differentiation and function. Nat Rev Immunol. 2016;16:220-233.

4. Chen X, et al. Concomitant overexpression of mir-182-5p and mir-182-3p raises the possibility of IL17-producing Treg formation in breast cancer by targeting CD3d, ITK, FOXO1, and NFATs: Ameta analysis and experimental study. Cancer Sci.2021;112: 589-603.

5. Broniscer A, et al. The organizing principle in the formation of the T Cell Receptor-CD3 Complex. Cell. 2022;111:967-979.

6. Wang SG, et al. Identification of key target genes and biological pathways in Multiple Sclerosis brains using Microarray data obtained from the Gene Expression Omnibus database. Neurol Res. 2018;40:883-891.