

The cerebral cortex



The Cerebral cortex is located on the outermost part of the brain. It's composed of neural tissue and plays a vital role in attention, memory, language, thought, perceptual awareness and consciousness. Several horizontal layers constitute the cerebral cortex, each having diverse composition of neurons. Listed in the order of the most superior to least superior, these layers are; the external granular layer, the molecular layer, the medial pyramidal layer, the ganglionic layer, the internal granular layer, and the multiform layer. The external granular layer contains pyramidal and granular cells and is most superior; the molecular layer contains neurological cell bodies and it's very dense; the medial pyramidal layer contains association fibers as well as pyramidal cells; the ganglionic and fusi-form layer have axioms which link the cortex to the white matter.

According to the Brodmann system of classification the cerebral cortex is made up of the following areas; temporal lobe, occipital lobe, the parietal lobe and the frontal lobe. The surface of the Cerebral cortex is folded therefore more than seventy percent of it is hidden in grooves referred to as sulci. The cerebral cortex is linked to several subcortical structures, for example the basal ganglia, and the thalamus. Information sent through efferent connections and the afferent connections is used to receive information; however almost all information is directed through the thalamus before reaching the cerebral cortex. In addition, the olfactory information is routed to the olfactory cortex.

The sensory part of the cerebral cortex processes and receives information from sensory areas. Vision, touch and audition senses are linked to the primary visual cortex, somatosensory cortex and auditory cortex. Thus the

two hemispheres of the cortex receive information from contra-lateral sides of the body. E. g. the left limbs send information to the right side of the somatosensory complex. Areas which have many sensory innervations need more links to the cerebral cortex so as to process greater sensation. The occipital lobe interprets visual input received from the eyes and transmits this information directly to the parietal lobe also known as Wernicke's area as well as the frontal lobe (motor cortex).

One of the main roles of the occipital lobe is to construe the upside-down images which are captured by the retina from the eye lens. The temporal lobe interprets auditory input from the ears and transmits it to Wernicke's area in the parietal lobe. The areas which process motor information are located on both cortex hemispheres; these motor areas control voluntary movements such as movement of the hands. The right side of the motor area is linked to the left side of body. Voluntary movements are usually guided by three parts; the dorsolateral prefrontal cortex; the cerebral cortex; the posterior parietal cortex, and the primary motor complex. Interconnected sub cortical tissue of gray matter referred to as basal nuclei are also greatly involved in motor control.

The association areas of the cerebral cortex enable individuals to have perceptual experience of the environment. It helps a person to effectively interact as well as support language and abstract thinking. The frontal area lobe also referred to as the Broca's area processes language by sending signals to muscles that produce sound (larynx, lips and mouth). If this area is damaged it leads to motor aphasia whereby patients cannot make appropriate or meaningful language. The temporal, parietal and occipital

lobes found in the posterior section of the cortex arrange sensory information into logical perception of the environment. In addition, the prefrontal association complex is in charge of planning movement, actions and abstract thoughts. Language expression, reception and abilities, are executed in the left hemisphere of the frontal lobe.