Neuroscience behind Schizophrenia

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Schizophrenia is a severe brain disorder that interferes with how individuals think, behave, and feel. Individuals suffering from schizophrenia interpret realities abnormally because they seem to have lost touch withit. This results in a substantial distress among the victims, friends, and family members.The symptoms of schizophrenia include delusions, where people have false beliefs and hallucinations, where they see or hear things that do not exist. Another symptom is disorganized speech or thinking because the disorder impairs effective communication. Individuals also tend to experience negative symptoms, such as lack of motivation, disinterest in routine activities, difficulties to function normally, or social withdrawal. The symptoms of the disease can cause disability if left untreated.

Schizophrenia onset takes place during the late stages of adolescence or early adulthood. The adolescence period involves a lot of profound changes because significant cognitive functions like planning, abstract thinking, and reasoning attain their maturation. Disturbances of the pruning process that take place in the prefrontal cortex during late adolescence and early adulthood stages have significant impact in triggering schizophrenia onset(Gold, 2011). Many schizophrenia studies reporteffects like decreased grey matter in various parts of the brain like prefrontal, medial temporal, and superior temporal. Decision-making or short-term memory, processing of auditory information, and episodic memory depend on those parts of the brain. Individuals can inherit abnormalities in the grey matter in schizophrenia. The reduction of the matter indicates decreased dendritic complexity and synaptic density, thus, impacting integration and interneuronal communication.

Theories describe schizophrenia as an illness with decreased or disturbed neural connectivity. The reduction or disturbance impairs the communication between various areas of the brain, leading to associated signs and symptoms as well as cognitive changes. Studies show that structural abnormalities in this disorder tend to become progressive when first symptoms begin to appear and during its initial stages. The characteristics of theprodromal stage of the disorder consists of sub diagnosticsymptoms and declined functioning. Patients in this stage are described as clinical high-risk patients(Frangou, 2014). The volume of grey matterin the prefrontal cortex among young people and healthy individuals tend to decline due to development processes in the brain that takes place during adolescence. Psychological changes and deficits in working and long-term memory are common among patients with chronic schizophrenia.Structural changes in white and grey matter and functional differences do not result from long-term impact of the illness. People at high risk of inheriting genetic schizophrenia, such as siblings can indicate the impacts of schizophrenia’s genetic components in the absence of signs and symptoms, medication, and progression of the disorder. Some of the symptoms of this disease may occur due to lack of coordination among various regions of the brain.

Temporal lobes, cerebellum, thalamus, corpus callosum, frontal lobes, and caudate nucleus are the most affected areas of the brain in schizophrenia. Abnormalities in temporal lobes include the reduction of discrete structures and general reduction of the temporal lobe. The effect on cerebellum is that the disturbance of cerebellar networks leads to cognitive dymetria in schizophrenia. Decrement of pulvinar and mediodorsal nuclei of the thalamus contributes to the risks of schizophrenia. Changes in the volume and size of the corpus callosum are common among patients with schizophrenia. These changes can include displacement of the focal, reduction of corpus callosum thickness, and displacement of upper stem structures of the brain(Gur, 2011). Additionally, schizophrenic patients have reduced volume of the frontal lobe.

The brain consists of dopamine and glutamate chemicals whose task involves carrying messages to cells in brain pathways. Physicians believe that these pathways are responsible for controlling how people think and perceive things. Researchers link dopamine to symptoms of schizophrenia, such as delusions and hallucinations since brain regions that run dopamine may become overactive. On the other hand, glutamate is a brain chemical whose role involves the formation of memories and helping people to learn and understand new things. It also informs various regions of the brain what to do. Studies indicate that individuals with too much glutamate activities is specific parts of the brain are at a high risk of developing the disorder. However, technology facilitates brain imaging, where physicians can observe changes in several regions of the brain. They can as well determine the potential loss of tissues in the brain. Young people experiencing loss of brain tissues are at risk of developing schizophrenia. The treatment of this disorder involves the use of antipsychotic medications, which control the disorder’s symptoms.

To summarize, schizophrenia is a severe mental disorder that affects the brain. Its symptoms include hallucinations, delusions, disorganized speech and thinking, and negative symptoms like social withdrawals. The onset of the disorder occurs during the late stages of adolescence or early adulthood periods. This is because most development activities of the brain take place during this time. Abnormalities in various parts of the brain are linked to the disorder. The most affected areas in the brain are Temporal lobes, cerebellum, thalamus, corpus callosum, frontal lobes, and caudate nucleus. Fortunately, medications, such as antipsychotic drugs are effective in treating schizophrenia disorder. Doctors can conduct brain imaging to determine the extent of brain damage and then treat the patients.

References

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