

Neuroanatomic observations of the brain in autism
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Autism is a behaviorally defined disorder of unknown etiology, characterized by impaired social skills, delayed and disordered language and limited areas of interest. Microscopic observations in the autistic brain have found reduced cell size and increased cell packing density (increased number of nerve cells per unit volume) bilaterally in the hippocampus, amygdala, entorhinal cortex, mammillary body, medial septal nucleus and anterior cingulate gyrus. These structures are known to be connected to each other by inter-related circuits and comprise a major portion of the limbic system of the brain. The limbic system is known to be important for learning, memory, emotion and behavior, and plays a major role in the processing, integration and generalization of information. These abnormalities of the limbic system could account for many of the key clinical features of autism, including the disordered acquisition and utilization of language and deficits in social behavior.

Additional abnormalities have been found in the cerebellum where the number of Purkinje cells are markedly reduced in number, primarily in the posterior and inferior portions of the hemispheres bilaterally. The vermis appears to be microscopically normal. Abnormalities have also been noted in the deep cerebellar nuclei, findings which seem to vary with the age of the patient. Similar observations have been noted in the neurons of the inferior olivary nucleus and the nucleus of the Diagonal Band of Broca in the septum. The preservation of olivary neurons in the face of markedly reduced numbers of Purkinje cells suggests that these brain lesions are of prenatal origin. This finding is consistent with the studies of others.

The role of the cerebellum in autistic behavior is uncertain. Studies have suggested that it may play a role in the modulation of emotional affect, language, mental imagery, some aspects of attention, anticipatory planning, and cognition. Thus, it is likely that abnormalities in both the cerebellum and the limbic system are important for our understanding of many of the clinical features of autism.

References

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Objectives

- 1) Participants will be able to identify areas of the brain which have been found to be abnormal in autism.
- 2) Participants will be able to discuss some of the functional features of the limbic system and cerebellum.
- 3) Participants will have an understanding of how abnormalities of the limbic system and cerebellum might be related to many of the clinical features of autism.

Objectives

- 1) Participants will be familiar with the diagnostic criteria for disorders categorized under the Pervasive Developmental Disorders (PDD) as well as those developmental disabilities which may mimic PDD.
- 2) Participants will have a basic understanding of the underlying neurobiology of the Pervasive Developmental Disorders and their possible causes.
- 3) Participants will develop knowledge of conventional and “alternative” therapies for children with PDD.