

# Mini Review on Agenesis of the Corpus Callosum: A Rare Anomaly of the Human Brain

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## ABSTRACT

The human brain is a complex and fascinating organ, with many intricacies that are still not fully understood. However, in rare cases, anomalies can occur that provide unique insights into brain function. In this mini-review, we

discuss a rare anomaly of the human brain known as agenesis of the corpus callosum, which is characterized by the absence of the corpus callosum, the largest white matter tract in the brain. We explore the causes, symptoms, and effects of this anomaly, as well as its implications for our understanding of brain function.

**Key Words:** Agenesis of corpus callosum; Brain anomaly; White matter tract; Brain function

## INTRODUCTION

The human brain is a complex and fascinating organ that is responsible for a wide range of functions, including perception, cognition, emotion, and behavior. However, despite decades of research, there is still much we do not know about how the brain works [1]. One way we can gain insights into brain function is by studying rare anomalies of the brain, which can provide unique windows into how the brain works [2].

One such anomaly is agenesis of the corpus callosum, which is a rare condition characterized by the complete or partial absence of the corpus callosum, the largest white matter tract in the brain. This condition affects approximately 1 in 4,000 individuals and can have a wide range of symptoms and effects on brain function [3]. In this mini-review, we will explore the causes, symptoms, and effects of agenesis of the corpus callosum, as well as its implications for our understanding of brain function [4].

## MINI REVIEW

**Causes:** Agenesis of the corpus callosum can be caused by a range of factors, including genetic mutations, prenatal infections, and exposure to drugs or toxins during fetal development. However, in many cases, the cause is unknown [5-7].

**Symptoms:** The symptoms of agenesis of the corpus callosum can vary widely depending on the severity and extent of the anomaly. In some cases, individuals may have no symptoms at all, while in other cases, they may experience a range of cognitive, emotional, and behavioral difficulties [8].

One common symptom of agenesis of the corpus callosum is a lack of coordination between the two hemispheres of the brain. This can lead to difficulties with tasks that require both hemispheres to work together, such as certain types of problem-solving, language processing, and social interactions. Other symptoms may include developmental delays, intellectual disability, seizures, and sensory deficits. Additionally, individuals with agenesis of the corpus callosum may be at increased risk for certain psychological disorders, such as schizophrenia and autism spectrum disorder [9-10].

Effects on brain function: The absence of the corpus callosum can have a wide range of effects on brain function. One of the most significant is a lack of communication between the two hemispheres of the brain. The corpus callosum is responsible for transmitting information between the two hemispheres, and without it, the two hemispheres must find alternative ways to communicate.

This can lead to a range of difficulties with tasks that require both hemispheres to work together. For example, individuals with agenesis of the corpus callosum may have difficulty with tasks that require them to integrate visual and verbal information, such as reading or understanding metaphors. They

may also have difficulty with tasks that require them to coordinate movements on both sides of their body, such as playing sports or musical instruments. In addition, the absence of the corpus callosum can lead to changes in brain structure and function. Studies have shown that individuals with agenesis of the corpus callosum may have reduced brain volume in certain areas, as well as alterations in brain connectivity and functional activity [11].

Implications for our understanding of brain function: Studies of agenesis of the corpus callosum have provided valuable insights into how the brain works, particularly in terms of the role of the corpus callosum in brain function. By studying individuals with this condition, researchers have been able to identify alternative ways in which the two hemispheres of the brain can communicate, such as through other white matter tracts or through increased reliance on certain brain regions.

In addition, studies of agenesis of the corpus callosum have shed light on the neural basis of certain cognitive and behavioral functions. For example, research has shown that individuals with agenesis of the corpus callosum have difficulty with certain aspects of social cognition, such as understanding the emotions of others and interpreting social cues. This suggests that the corpus callosum plays an important role in social cognition, which has implications for our understanding of conditions such as autism spectrum disorder [12].

## CONCLUSION

Agenesis of the corpus callosum is a rare anomaly of the human brain that provides unique insights into brain function. Although the condition can have a wide range of symptoms and effects on brain function, it has also provided valuable insights into how the brain works, particularly in terms of the role of the corpus callosum in brain function. Further research on this condition may continue to shed light on the neural basis of cognitive and behavioral functions, as well as on the mechanisms by which the brain compensates for the absence of the corpus callosum.

**CONFLICTS OF INTEREST:** None.

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