CHMP2B-Related Frontotemporal Dementia

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CHMP2B-related frontotemporal dementia is a progressive brain disorder that affects personality, behavior, and language. The symptoms of this disorder usually become noticeable in a person's fifties or sixties, and affected people survive about 3 to 21 years after the appearance of symptoms.

Keywords: genetic conditions

1. Introduction

Changes in personality and behavior are the most common early signs of *CHMP2B*-related frontotemporal dementia. These changes include inappropriate emotional responses, restlessness, loss of initiative, and neglect of personal hygiene. Affected individuals may overeat sweet foods or place non-food items into their mouths (hyperorality). Additionally, it may become difficult for affected individuals to interact with others in a socially appropriate manner. They increasingly require help with personal care and other activities of daily living.

Many people with *CHMP2B*-related frontotemporal dementia develop progressive problems with speech and language (aphasia). They may have trouble speaking, although they can often understand others' speech and written text. Affected individuals may also have difficulty using numbers (dyscalculia). In the later stages of the disease, many completely lose the ability to communicate.

Several years after signs and symptoms first appear, some people with *CHMP2B*-related frontotemporal dementia develop problems with movement. These movement abnormalities include rigidity, tremors, uncontrolled muscle tensing (dystonia), and involuntary muscle spasms (myoclonus). As the disease progresses, most affected individuals become unable to walk.

2. Frequency

CHMP2B-related frontotemporal dementia has been reported in one large family in Denmark and a few unrelated individuals from other countries. This disease appears to be a rare form of frontotemporal dementia.

3. Causes

CHMP2B-related frontotemporal dementia results from mutations in the *CHMP2B* gene. This gene provides instructions for making a protein called charged multivesicular body protein 2B. This protein is active in the brain, where it plays an essential role in transporting proteins that need to be broken down (degraded).

Mutations in the *CHMP2B* gene lead to the production of an abnormal version of charged multivesicular body protein 2B. Most of the mutations that cause *CHMP2B*-related frontotemporal dementia result in the production of an abnormal protein that is missing a critical segment at one end. This segment keeps the protein turned off (inactive) when it is not needed. Without this segment, the protein is constantly turned on (active), which disrupts the transport and degradation of other proteins. These abnormalities ultimately lead to the death of nerve cells (neurons) in the brain.

A gradual loss of neurons throughout the brain is characteristic of *CHMP2B*-related frontotemporal dementia. Many of the features of this disease result from neuronal death in regions near the front of the brain called the frontal and temporal lobes. The frontal lobes are involved in reasoning, planning, judgment, and problem-solving, while the temporal lobes help process hearing, speech, memory, and emotion. It is unclear why the signs and symptoms of this disease are related primarily to the frontal and temporal lobes.

3.1. The Gene Associated with CHMP2B-Related Frontotemporal Dementia

- CHMP2B

4. Inheritance

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder.

5. Other Names for This Condition

- chromosome 3-linked frontotemporal dementia
- DTM1
- FTD-3
- FTD-CHMP2B
- FTD3

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