DEPDC5 Gene

Subjects: Genetics
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Definition

DEP Domain Containing 5

1. Normal Function

The *DEPDC5* gene provides instructions for making a protein that is one piece of a group of proteins (complex) called GATOR1. This complex is found in cells throughout the body, where it regulates a signaling pathway called the mTOR pathway. The mTOR pathway is involved in cell growth and division (proliferation), the survival of cells, and the creation (synthesis) of new proteins. The role of the GATOR1 complex is to block this pathway by inhibiting (stopping) the activity of a complex called mTOR complex 1 (mTORC1) that is integral to the mTOR pathway.

In the brain, the mTOR pathway regulates many processes, including the growth and development of nerve cells and their ability to change and adapt over time (plasticity).

2. Health Conditions Related to Genetic Changes

2.1 Familial Focal Epilepsy with Variable Foci

More than 80 mutations in the *DEPDC5* gene have been found to cause familial focal epilepsy with variable foci (FFEVF), which is an uncommon form of recurrent seizures (epilepsy) that runs in families. Affected individuals experience focal seizures, which are seizures that do not cause a loss of consciousness. Most of the *DEPDC5* gene mutations lead to the production of an abnormally short protein that is quickly broken down. As a result, formation of normal GATOR1 complex is reduced, leading to overactivity of mTORC1 and excessive signaling of the mTOR pathway. It is not clear how an abnormally active mTOR pathway leads to the focal seizures of FFEVF. Research suggests that increased mTOR pathway signaling in the brain leads to changes in the connections between nerve cells (synapses) and increased activation (excitation) of nerve cells, which can cause seizures.

For unknown reasons, some people with FFEVF caused by a *DEPDC5* gene mutation never develop the condition, a situation known as reduced penetrance. It is estimated that 60 percent of individuals with *DEPDC5* gene mutations go on to develop FFEVF.

2.2 Other Disorders

Mutations in the *DEPDC5* gene can cause other seizure disorders, known as familial mesial temporal lobe epilepsy and infantile spasms. Similar to individuals with FFEVF (described above), people with familial mesial temporal lobe epilepsy have focal seizures. They may also have feelings of déjà vu, fear, or nausea during the seizure. Infantile spasms are seizures that usually appear before the age of 1 and involve recurrent muscle contractions.

As in FFEVF, most of the *DEPDC5* gene mutations that cause familial mesial temporal lobe epilepsy or infantile spasms lead to reduced GATOR1 complex formation and an abnormally active mTOR pathway. It is unclear why individuals with mutations in the same gene develop different seizure disorders.

3. Other Names for This Gene

- DEP.5
- FFEVF
- FFEVF1

- KIAA0645

References

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Keywords

genes