CLCF1 Gene

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cardiotrophin like cytokine factor 1

genes

1. Normal Function

The *CLCF1* gene provides instructions for making a protein called cardiotrophin-like cytokine factor 1 (CLCF1). This protein partners with a similar protein called cytokine receptor-like factor 1 (CRLF1), which is produced from the *CRLF1* gene. Together, these two proteins form a unit known as the CRLF1/CLCF1 protein complex. This complex attaches (binds) to a receptor protein known as the ciliary neurotrophic factor receptor (CNTFR) on the surface of many types of cells. When the CRLF1/CLCF1 protein complex is bound to CNTFR, it triggers signaling inside the cell that affects cell development and function.

The CNTFR signaling pathway is primarily involved in the development and maintenance of the nervous system. It promotes the survival of nerve cells (neurons), particularly nerve cells that control muscle movement (motor neurons). The CNTFR pathway also plays a role in a part of the nervous system called the sympathetic nervous system, specifically in the regulation of sweating in response to temperature changes and other factors. This signaling pathway appears to be critical for the normal development and maturation of nerve cells that control the activity of sweat glands.

Studies suggest that the CNTFR signaling pathway also has functions outside the nervous system. It may be involved in the body's inflammatory response, which helps fight infection and facilitate tissue repair following an injury. This pathway may also be important for the development and maintenance of bone tissue. However, little is known about the role of CNTFR signaling in these processes.

2. Health Conditions Related to Genetic Changes

2.1. Cold-induced sweating syndrome

At least four mutations in the *CLCF1* gene have been reported to cause cold-induced sweating syndrome, a rare condition characterized by problems with regulating body temperature and other abnormalities affecting many parts of the body. When this condition is caused by *CLCF1* gene mutations, it is known as CISS2.

Mutations in the *CLCF1* gene lead to the production of a nonfunctional version of the CLCF1 protein. The defective protein is unable to interact with the CLRF1 protein and bind to CNTFR, which disables the CNTFR signaling pathway.

Researchers believe that a failure of CNTFR signaling underlies the major features of cold-induced sweating syndrome. A loss of this signaling pathway during sympathetic nervous system development may help explain the abnormal sweating that is characteristic of this condition, including unusual sweating patterns and related problems with body temperature regulation. The CNTFR pathway's involvement in motor neuron development and bone development provides clues to some of the other signs and symptoms of the disorder, including distinctive facial features, facial muscle weakness, and skeletal abnormalities. However, little is known about how a lack of CNTFR signaling leads to these varied features.

3. Other Names for This Gene

- B-cell stimulating factor 3
- B-cell stimulatory factor 3
- BSF-3
- BSF3
- cardiotrophin-like cytokine
- cardiotrophin-like cytokine factor 1
- CISS2
- CLC
- CLCF1_HUMAN
- CRLF1 associated cytokine-like factor 1
- neurotrophin-1/B-cell stimulating factor-3
- NNT-1
- NNT-1/BSF-3
- NNT1
- novel neurotrophin-1
- NR6

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