

ISCU Gene

Subjects: Genetics & Heredity

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Iron-sulfur cluster assembly enzyme

Keywords: genes

1. Introduction

The *ISCU* gene provides instructions for making a protein called the iron-sulfur cluster assembly enzyme. As its name suggests, this enzyme is involved in the formation of clusters of iron and sulfur atoms (Fe-S clusters). Specifically, the enzyme acts as a platform, or scaffold, for the assembly of these clusters. Fe-S clusters are critical for the function of many different proteins, including those needed for DNA repair and the regulation of iron levels. Proteins containing Fe-S clusters are also necessary for energy production within mitochondria, which are the cell structures that convert the energy from food into a form that cells can use.

2. Health Conditions Related to Genetic Changes

2.1. Myopathy with Deficiency of Iron-Sulfur Cluster Assembly Enzyme

At least two mutations in the *ISCU* gene have been found to cause myopathy with deficiency of iron-sulfur cluster assembly enzyme. The more common mutation, written as IVS5+382G>C, alters the way the gene's instructions are pieced together to produce the enzyme. Most affected individuals have this mutation in both copies of the *ISCU* gene in each cell. The other mutation, which has been identified in one family, replaces the amino acid glycine with the amino acid glutamate at position 50 in the enzyme (written as Gly50Glu or G50E). Affected individuals in this family have had the G50E mutation in one copy of the *ISCU* gene in each cell and the IVS5+382G>C mutation in the other copy of the gene. This combination of mutations causes a severe variant of the disorder characterized by progressive muscle weakness and wasting.

Mutations in the *ISCU* gene severely limit the amount of iron-sulfur cluster assembly enzyme that is made in cells. A shortage of this enzyme prevents the normal production of proteins that contain Fe-S clusters, which disrupts a variety of cellular activities. A reduction in the amount of iron-sulfur cluster assembly enzyme is particularly damaging to skeletal muscle cells. Within the mitochondria of these cells, a lack of this enzyme causes problems with energy production and an overload of iron. These defects lead to muscle weakness, pain, and the other features of myopathy with deficiency of iron-sulfur cluster assembly enzyme.

3. Other Names for This Gene

- HML
- hnifU
- iron-sulfur cluster scaffold homolog (E. coli)
- IscU
- IscU iron-sulfur cluster scaffold homolog
- ISCU_HUMAN
- ISU2
- MGC74517

- NIFU
 - NifU-like N-terminal domain containing
 - NIFUN
 - nitrogen fixation cluster-like
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