FA2H Gene

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Fatty Acid 2-Hydroxylase: The FA2H gene provides instructions for making an enzyme called fatty acid 2-hydroxylase.

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1. Normal Function

This enzyme modifies fatty acids, which are building blocks used to make fats (lipids). Specifically, fatty acid 2-hydroxylase adds a single oxygen atom to a hydrogen atom at a particular point on a fatty acid to create a 2-hydroxylated fatty acid. Certain 2-hydroxylated fatty acids are important in forming normal myelin; myelin is the protective covering that insulates nerves and ensures the rapid transmission of nerve impulses. The part of the brain and spinal cord that contains myelin is called white matter.

2. Health Conditions Related to Genetic Changes

2.1 Fatty Acid Hydroxylase-Associated Neurodegeneration

At least nine mutations in the *FA2H* gene have been identified in people with fatty acid hydroxylase-associated neurodegeneration (FAHN). FAHN is a progressive disorder of the nervous system characterized by problems with movement and vision that begin during childhood or adolescence and worsen with age. Brain scans of affected individuals show abnormal accumulation of iron in the brain, especially in a region that is involved in movement.

The *FA2H* gene mutations that cause FAHN reduce or eliminate the function of the fatty acid 2-hydroxylase enzyme. Reduction of this enzyme's function may result in abnormal myelin that is prone to deterioration (demyelination), leading to a loss of white matter (leukodystrophy). Leukodystrophy is likely involved in the development of the movement problems and other neurological abnormalities that occur in FAHN. Iron accumulation in the brain is probably also involved, although it is unclear how *FA2H* gene mutations lead to the buildup of iron.

People with *FA2H* gene mutations and some of the movement problems seen in FAHN were once classified as having a separate disorder called spastic paraplegia 35. People with mutations in this gene resulting in intellectual decline and optic nerve atrophy were said to have a disorder called *FA2H*-related leukodystrophy. However, these conditions are now generally considered to be forms of FAHN.

3. Other Names for This Gene

- FA2H_HUMAN
- FAAH
- FAH1
- fatty acid alpha-hydroxylase
- fatty acid hydroxylase domain containing 1
- FAXDC1
- FLJ25287
- SCS7
- spastic paraplegia 35 (autosomal recessive)

- SPG35

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