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My46 Trait Profile

Isovaleric acidemia

Other Names: Isovaleryl-CoA dehydrogenase deficiency

Isovaleric acidemia is a rare condition characterized by the body's inability to fully break down a certain amino acid called leucine. It is caused by mutations in the IVD gene that makes an enzyme called isovaleryl-CoA dehydrogenase.

Characteristics of Isovaleric acidemia

Isovaleric acidemia (IVA) is a genetic condition in which the body cannot metabolize (i.e., break down and use) certain proteins properly. As a result, other compounds can build up in blood, urine, and tissues. Too much of these compounds can be harmful to the body and cause health problems. People with IVA have difficulty breaking down a certain amino acid called leucine.

There are many different health problems that can occur in individuals with IVA. Some of these problems are mild, but others can be very serious and life-threatening. Some babies who are born with IVA become very sick right away. They might have trouble feeding, vomit, have seizures, and have very little energy. If these problems are not treated immediately, they can get worse and sometimes result in coma or death. Sometimes, when people with IVA are very sick, the buildup of compounds can cause a certain smell. This smell is often described as a "sweaty feet" or "sweaty socks smell.

Not all people with IVA are sick right at birth. Sometimes, the signs and symptoms of IVA might show up during childhood and can come and go over time. Children with IVA may have trouble gaining weight and growing. They also can have delayed development. Certain activities can trigger episodes of health problems. These include fasting (not eating for a long time), infections or eating too much protein.

Diagnosis/Testing

Most individuals with IVA have changes or mutations in the IVD gene. This gene makes the isovaleryl acid-CoA dehydrogenase enzyme that is responsible for breaking down the amino acid called leucine. Mutations in the IVD gene that cause in the enzyme to not be made or to not be made properly result in many of the health problems seen in individuals with IVA.

Many babies with IVA are diagnosed early in life through newborn screening (NBS). NBS tests a spot of blood from the baby's heel, and looks to see if the isovaleryl-CoA dehydrogenase is working properly. NBS test results are confirmed with additional blood and urine chemical tests, and possibly genetic testing of the IVD gene.

Management/Surveillance

Individuals with IVA are typically managed by a team of specialty providers that can include: geneticists, genetic counselors, primary care doctors, nutritionists, and social workers. The amino acid "leucine" is found in many of the foods we eat, usually what we would call "protein-rich foods." This also includes breast milk and infant formulas. This means it is very important for individuals with IVA to follow a customized low-protein diet. This diet usually includes a medical formula specially made to provide all amino acids except for leucine to ensure good nutrition. Specific medications and vitamin supplements (i.e. L-carnitine) are also often prescribed. It is recommended that an emergency treatment plan, often documented by an "Emergency Letter" is made to ensure that during times of illness or other metabolic stress, a

child with IVA will be assessed for signs and symptoms of a metabolic crisis (e.g., poor feeding, vomiting, lethargy, excessive sleepiness, irritability) and given appropriate medical attention. It is of upmost importance that individuals with IVA adhere to their specific diet and treatment plans to avoid metabolic stress and/or crisis.

Mode of inheritance

IVA is inherited in an autosomal recessive pattern. This means that an individual has to inherit two IVD mutations (i.e., one from each parent) to be affected with IVA. If both parents are carriers of an IVD mutation, they have a 1 in 4 (25%) chance with each pregnancy of having a child with IVA. Babies born in the United States are screened for IVA by newborn screening.

Risk to family members

Parents of a child with IVA are carriers of IVA. If a sibling of a child with IVA is unaffected, he/she has a 2 in 3 (66%) chance of being a carrier of IVA.

Special considerations

None

Resources

Genetics Home Reference: Isovaleric Acidemia
http://ghr.nlm.nih.gov/condition/isovaleric-acidemia
Organic Acidemia Association
http://www.oaanews.org

References

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