Chanarin-Dorfman Syndrome

Subjects: Genetics & Heredity

Contributor: Nicole Yin

Chanarin-Dorfman syndrome is a condition in which fats (lipids) are stored abnormally in the body. The signs and symptoms vary greatly among individuals with Chanarin-Dorfman syndrome. Some people may have ichthyosis only, while others may have problems affecting many areas of the body.

genetic conditions

1. Introduction

Affected individuals cannot break down certain fats called triglycerides, and these fats accumulate in organs and tissues, including skin, liver, muscles, intestine, eyes, and ears. People with this condition also have dry, scaly skin (ichthyosis), which is usually present at birth. Additional features of this condition include an enlarged liver (hepatomegaly), clouding of the lens of the eyes (cataracts), difficulty with coordinating movements (ataxia), hearing loss, short stature, muscle weakness (myopathy), involuntary movement of the eyes (nystagmus), and mild intellectual disability.

2. Frequency

Chanarin-Dorfman syndrome is a rare condition; its incidence is unknown.

3. Causes

Mutations in the *ABHD5* gene cause Chanarin-Dorfman syndrome. The *ABHD5* gene provides instructions for making a protein that turns on (activates) the ATGL enzyme, which breaks down triglycerides. Triglycerides are the main source of stored energy in cells. These fats must be broken down into simpler molecules called fatty acids before they can be used for energy.

ABHD5 gene mutations impair the protein's ability to activate the ATGL enzyme. An inactive enzyme makes the breakdown of triglycerides impossible, causing them to accumulate in tissues throughout the body. The buildup of triglycerides results in the signs and symptoms of Chanarin-Dorfman syndrome.

3.1. The Gene Associated with Chanarin-Dorfman Syndrome

- ABHD5

4. Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

5. Other Names for This Condition

- CDS

- Chanarin-Dorfman disease

- Ichthyotic neutral lipid storage disease

- neutral lipid storage disease with ichthyosis

- Triglyceride storage disease with ichthyosis

- triglyceride storage disease with impaired long-chain fatty acid oxidation

References

1. Bruno C, Bertini E, Di Rocco M, Cassandrini D, Ruffa G, De Toni T, Seri M,Spada M, Li Volti G, D'Amico A, Trucco F, Arca M, Casali C, Angelini C, DimauroS, Minetti C. Clinical and genetic characterization of Chanarin-Dorfman syndrome.Biochem Biophys Res Commun. 2008 May 16;369(4):1125-8. doi:10.1016/j.bbrc.2008.03.010.

2. Bruno C, Dimauro S. Lipid storage myopathies. Curr Opin Neurol. 2008Oct;21(5):601-6. doi: 10.1097/WCO.0b013e32830dd5a6. Review.

3. Elias PM, Williams ML, Holleran WM, Jiang YJ, Schmuth M. Pathogenesis ofpermeability barrier abnormalities in the ichthyoses: inherited disorders oflipid metabolism. J Lipid Res. 2008 Apr;49(4):697-714. doi:10.1194/jlr.R800002-JLR200.

4. Lass A, Zimmermann R, Haemmerle G, Riederer M, Schoiswohl G, Schweiger M,Kienesberger P, Strauss JG, Gorkiewicz G, Zechner R. Adipose triglyceridelipase-mediated lipolysis of cellular fat stores is activated by CGI-58 anddefective in Chanarin-Dorfman Syndrome. Cell Metab. 2006 May;3(5):309-19.

5. Lefèvre C, Jobard F, Caux F, Bouadjar B, Karaduman A, Heilig R, Lakhdar H,Wollenberg A, Verret JL, Weissenbach J, Ozgüc M, Lathrop M, Prud'homme JF,Fischer J. Mutations in CGI-58, the

gene encoding a new protein of theesterase/lipase/thioesterase subfamily, in Chanarin-Dorfman syndrome. Am J HumGenet. 2001 Nov;69(5):1002-12.

6. Pujol RM, Gilaberte M, Toll A, Florensa L, Lloreta J, González-Enseñat MA,Fischer J, Azon A. Erythrokeratoderma variabilis-like ichthyosis inChanarin-Dorfman syndrome. Br J Dermatol. 2005 Oct;153(4):838-41.