



Niemann-Pick Disease (Type A)

Genetics Education and Counseling Program
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What is Niemann-Pick disease type A?

Niemann-Pick disease type A is caused by the lack of a substance (called acid sphingomyelinase, or ASM) in the body. ASM normally breaks down a substance called sphingomyelin. When ASM is absent from the body, sphingomyelin builds up in certain cells and causes damage to the central nervous system, liver, and lungs. Problems including developmental delay, progressive spasticity, blindness, an enlarged liver and/or spleen, and a "cherry red spot" in the eye (visible by a special eye exam) usually become apparent at 3 to 6 months of age. Niemann-Pick disease may also cause jaundice (a yellow color of the skin) in infancy and progressive liver failure.

Niemann-Pick disease type A is a fatal disease. Individuals with Niemann-Pick disease type A die between the ages of 1 and 4 years.

Who is at risk for Niemann-Pick disease?

Niemann-Pick disease may occur in any nationality and ethnic group, but Niemann-Pick disease type A is most common in Jews of Eastern European descent (Ashkenazi Jews). An estimated one in 100 Ashkenazi Jews is a carrier of Niemann-Pick disease. Carriers do not have Niemann-Pick disease but are capable of passing it on to their children if the other parent is also a carrier.

How do people get Niemann-Pick disease?

Niemann-Pick disease is an inherited condition, which means that it is passed from parents to their children. An individual with Niemann-Pick disease has inherited two changed copies of a particular gene, one from each parent. Genes are our body's "instructions" on how to develop and function. They are located on the structures in our cells called chromosomes. Since we inherit one set of chromosomes from each of our parents, chromosomes, and the genes located on them, are in pairs. If a person has one copy of the ASM gene functioning normally and the other copy not functioning, he or she is known as a carrier for Niemann-Pick disease. Carriers do not show any symptoms of Niemann-Pick disease and usually have no health problems related to Niemann-Pick disease, but they are capable of passing the copy of the gene that does not function properly on to their children.

If two carriers for Niemann-Pick disease have a child together, each child has a:

- 1-in-4 (25%) chance of having Niemann-Pick disease,
- 2-in-4 (50%) chance of being a carrier,
- 1-in-4 (25%) chance of neither having Niemann-Pick disease nor being a carrier.
- Unaffected siblings of individuals with Niemann-Pick disease have a 2/3 (66%) chance of being carriers.

In this way, even two individuals who are carriers for Niemann-Pick disease have a 75% chance to have a child without the disease. Because of this, families may not know that the gene that causes Niemann-Pick disease is running through their family, and individuals may not know that they are carriers of Niemann-Pick disease.

How is Niemann-Pick disease diagnosed?

Niemann-Pick disease is diagnosed by verifying a low level of acid sphingomyelase (ASM) in the body.

The gene for ASM is located on chromosome number 11. It is possible to look for specific changes in the gene. This requires a blood sample, and can identify greater than 92% of the gene changes for Niemann-Pick disease type A in the Ashkenazi Jewish population. This test is not recommended for individuals who are from other ethnic populations.

Prenatal diagnosis for Niemann-Pick disease type A is available using samples collected with procedures called chorionic villus sampling (CVS) or amniocentesis, which are performed early in pregnancy.

How are Niemann-Pick disease carriers identified?

A carrier screening test, which requires a sample of blood, can determine whether or not a gene change is present in the gene for ASM. By looking for the specific gene changes that are seen, it is possible to achieve a detection rate of greater than 92% in Ashkenazi Jews. This test is not recommended for individuals who are from other ethnic populations.

Genetic counseling is available to explain how Niemann-Pick disease is inherited, to describe the tests that can identify carriers, and to help families deal with the many emotions and concerns they may have regarding Niemann-Pick disease. For information regarding counseling and/or testing please call or e-mail Erin O'Rourke, M.S., or Nadene Henderson, M.S., at **(800) 334-7980**, erin.orourke@hgen.pitt.edu, or nadene.henderson@hgen.pitt.edu.

Is there a treatment for Niemann-Pick disease?

There is symptomatic treatment for Niemann-Pick disease type A. Our medical team provides comprehensive, compassionate care and maintains long-lasting relationships with our patients, their families, and their physicians to address all issues of concern. We are committed to offering the latest diagnostic testing, treatments, and therapies to our patients.

Where can individuals go for more information?

The **Center for the Study and Treatment of Jewish Genetic Diseases** at the UPMC Health System offers diagnosis, management, treatment, and genetic counseling for people with or at risk for genetic diseases common to the Ashkenazi Jewish population, including Niemann-Pick disease, and their families. The director of the program is John A. Barranger, M.D., Ph.D. For more information, or to schedule an appointment, please call or send e-mail to Erin O'Rourke, M.S., or Nadene Henderson, M.S., at **(800) 334-7980**, erin.orourke@hgen.pitt.edu, or nadene.henderson@hgen.pitt.edu. Please visit our World Wide Web Site: <http://www.pitt.edu/~geneorb>

Since printed materials are often out-of-date, we recommend that for more up-to-date information individuals visit the online version of this brochure at <http://www.pitt.edu/~edugene/Niemann.pdf>, or visit the main website of the Genetics Education and Counseling Program at <http://www.pitt.edu/~edugene>.

Individuals with Niemann-Pick disease, carriers, and their families may benefit from the following support groups:

National Niemann-Pick Disease Foundation, Inc.
3734 E. Olive Ave
Gilbert, AZ 85234
(602) 497-6638
<http://www.nnpdf.org>

National Foundation for Jewish Genetic Diseases, Inc.
250 Park Avenue, Suite 1000

New York, NY 10017
(212) 371-1030

Recent Publications

Raddadi AA, Al Twaim AA. Type A Niemann-Pick disease. *J Eur Acad Dermatol Venereol.* 2000 Jul;14(4):301-3.

Miranda SR, Erlich S, Friedrich VL Jr, Gatt S, Schuchman EH. Hematopoietic stem cell gene therapy leads to marked visceral organ improvements and a delayed onset of neurological abnormalities in the acid sphingomyelinase deficient mouse model of Niemann-Pick disease. *Gene Ther.* 2000 Oct;7(20):1768-76.

Schuchman EH. Hematopoietic stem cell gene therapy for Niemann-Pick disease and other lysosomal storage diseases. *Chem Phys Lipids.* 1999 Nov;102(1-2):179-88. Review.

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