Pompe Disease

Pompe disease is a rare genetic disorder caused by the buildup of glycogen, a storage form of glucose, in muscles and other tissues. It is characterized by progressive muscle weakness that can lead to heart, breathing, and mobility problems. The age of onset and severity of symptoms can vary widely. A person must have two different variants in the GAA gene, or two copies of the same variant, in order to have this condition.

Overview Scientific Details Frequently Asked Questions

Jamie, you have **two copies of the variant** we tested.

You are at risk of developing symptoms of Pompe disease. However, age of onset and symptom severity can vary widely. Your result may also be relevant if you're considering having children.

This test **does not diagnose** Pompe disease. If this result is unexpected, please discuss this report with a healthcare professional.

How To Use This Test

This test does not diagnose any health conditions.

Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Review the Carrier Status tutorial
See Scientific Details
See Frequently Asked Questions

Intended Uses

- Tests for **five variants** in the GAA gene.
- To identify carrier status for Pompe disease.
- Informs individuals with two variants in the GAA gene, or two copies of the c.-32-13T>G variant, that people with their result may be at risk of developing symptoms of Pompe disease.

Limitations

- Does **not test** for all possible variants for the condition. More than 400 variants in the GAA gene have been linked to Pompe disease, and this report only includes five of those variants.
- Does **not report** if someone has two copies of the c.397T>G, c.525delT, c.1548G>A, or c.2560C>T variant.
- Does **not rule out** the possibility of being a carrier for Pompe disease or the possibility of having the condition. In addition, this report does **not test** for variants linked to other types of glycogen storage disease or lysosomal storage disease.

Ethnicity Considerations

- This test includes variants that are most common in people of **African/African American** and **European** descent.
- This test does **not** include the majority of GAA variants that cause Pompe disease in people of East Asian descent.

You are at risk of developing symptoms of Pompe disease.

Your result may also be relevant if you're considering having children.

Talk to a healthcare professional.

People with your result are at risk of developing symptoms of Pompe disease. However, age of onset and symptom severity can vary widely, and further testing is needed to determine a diagnosis. It's important to talk with a healthcare professional if you are concerned about your result. **See Frequently Asked Questions for more information.**

Your results may be relevant for your family.

Because you have two copies of a variant, you will pass a variant on to each of your children. **If your partner is a carrier for Pompe disease**, each child may have a **50% chance** of having this condition. Your relatives may also wish to consider testing if they plan to have children.

About Pompe Disease

Also known as: Acid Maltase Deficiency, Glycogen Storage Disease Type II, Acid Alpha-Glucosidase (GAA) Deficiency

When symptoms develop

There are two types of Pompe disease that differ based on when symptoms develop and how certain organs are impacted. In infantile-onset Pompe disease (IOPD), symptoms including an enlarged heart develop prior to one year of age. In late-onset Pompe disease (LOPD), symptoms typically develop after one year of age and usually do not involve enlargement of the heart. In some cases, symptoms don't develop until mid-to-late adulthood.

Typical signs and symptoms

Symptoms can vary widely depending on age of onset and which GAA variants a person has. People with Pompe disease may experience:

- Progressive muscle weakness
- Movement issues, such as difficulty walking and exercise intolerance
- Difficulties with breathing and swallowing
- Enlarged heart (in infantile-onset type)

Ethnicities most affected

This condition affects people of all ethnicities but is best studied in people of African/African American, East Asian, and European descent.

How it's managed

Individuals with Pompe disease may see a number of different medical specialists for appropriate evaluation and management. Learn more from the **National Organization for Rare Disorders**.

Read more at: MedlinePlus GeneReviews National Organization for Rare Disorders

It is important to talk to a healthcare professional if you are concerned about your results.

You are at risk of developing symptoms of Pompe disease. It is important to consult with a healthcare professional about your result.

Print report

If you're starting a family, a genetic counselor can help you and your partner understand if additional testing might be appropriate.

Find a genetic counselor

See our Frequently Asked Questions for more information.

FAQs

Learn more about this condition and connect with support groups.

Learn more

Development of the Pompe Disease report was supported in part by Sanofi. 23andMe retains sole responsibility for the final report content.

Pompe Disease

Pompe disease is a rare genetic disorder caused by the buildup of glycogen, a storage form of glucose, in muscles and other tissues. It is characterized by progressive muscle weakness that can lead to heart, breathing, and mobility problems. The age of onset and severity of symptoms can vary widely. A person must have two different variants in the GAA gene, or two copies of the same variant, in order to have this condition.

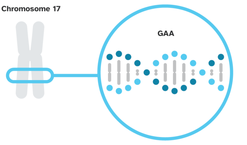
Overview Scientific Details Frequently Asked Questions

Pompe disease is caused by variants in the GAA gene.

GAA

The GAA gene contains instructions for making an enzyme called acid alpha-glucosidase, also known as acid maltase. This enzyme helps break down glycogen, a storage form of glucose, within cell compartments called lysosomes. Certain variants in the GAA gene prevent the enzyme from breaking down glycogen properly. This causes glycogen to build up in lysosomes and damage the body's organs and tissues, especially muscle.

Read more at MedlinePlus.



You have two copies of the variant we tested.

Variants Detected | View All Tested Markers

Marker Tested	Your Genotype*	Additional Information

*This test cannot distinguish which copy you received from which parent. This test also cannot determine whether multiple variants, if detected, were inherited from only one parent or from both parents. This may impact how these variants are passed down.

23andMe always reports genotypes based on the 'positive' strand of the human genome reference sequence (build 37). Other sources sometimes report genotypes using the opposite strand.

Test Interpretation and Clinical Performance

Carrier frequency and carrier detection rate are most relevant for people without a variant detected.

For people who do not have the variant(s) tested, it may be possible to calculate an estimate of post-test carrier risk (the chances of still being a carrier) using information in this table. **View technical article on estimating post-test carrier risk.**

For people with one or more variants that could not be determined, their remaining chances of being a carrier may be similar to or less than the carrier frequency in people of their ethnicity.

Carrier frequency and carrier detection rate

This report provides two pieces of information to help interpret certain genetic results.

- **Carrier frequency** is the average chance of being a carrier for this condition. For example, a carrier frequency of 1 in 59 means that 1 out of every 59 people is expected to be a carrier for this condition.
- **Carrier detection rate** is an estimate of the percentage of carriers for this condition that would be identified by this test. For example, if the carrier detection rate is 89%, then our test is able to detect 89% of carriers for this condition. In cases where ranges are provided, the estimated carrier detection rate may depend on the region or country of ancestry.

Carrier frequency and carrier detection rate vary by ethnicity and are provided only where sufficient data is available.

Ethnicity	Carrier frequency	Carrier detection rate	References
African/African American	Up to 1 in 69	78%	[1,19,24,28]
East Asian	1 in 56	<1%	[5,14,20,24,30,32]
European	1 in 59	52%	[6,12,13,21,24,29]
General U.S. population	1 in 51 to 1 in 89	54%	[2,4,16,22,28,31]

Test Details

Indications for Use

The 23andMe PGS Carrier Status Test for Pompe Disease is indicated for the detection of five variants in the GAA gene. This test is intended to be used to determine carrier status for Pompe disease in adults. This report also describes if a result is associated with personal risk of developing symptoms of Pompe disease, but it does not describe a person's overall risk of developing symptoms. This test includes variants that are most common in people of African/African American and European descent.

Special Considerations

- The severity of symptoms, and when they develop, can vary greatly in people with Pompe disease. For example, certain combinations of genetic variants, including two copies of the c.-32-13T>G variant included in this report, tend to be associated with milder symptoms and later disease onset. On the other hand, some combinations of genetic variants included in this report tend to be associated with faster progression and more severe symptoms.
- ACMG recommends that people of all ethnicities who are considering having children should be offered carrier screening for Pompe disease.

Test Performance Summary

Clinical Performance

This test is expected to detect the majority of Pompe carriers of African/African American descent and about half of Pompe carriers of European descent and in the general U.S. population. It is not expected to detect most Pompe carriers of East Asian descent. See the Test Interpretation and Clinical Performance section above for additional details about carrier detection rates.

Analytical Performance

Accuracy was determined by comparing results from this test with results from sequencing. Greater than 99% of test results were correct. While unlikely, this test may provide false positive or false negative results. For more details on the analytical performance of this test, refer to the package insert.

Warnings and Limitations

- This test does not cover all variants that could cause this condition.*
- This test does not diagnose any health conditions.
- Positive results in individuals whose ethnicities are not commonly associated with this condition may be incorrect. Individuals in this situation should consider genetic counseling and follow-up testing.
- Share results with your healthcare professional for any medical purposes.
- If you are concerned about your results, consult with a healthcare professional.

See the **Package Insert** for more details on use and performance of this test.

* Variants not included in this test may be very rare, may not be available on our genotyping platform, or may not pass our testing standards.

References

1. **Becker JA et al. (1998). "The African origin of the common mutation in African American patients with glycogen-storage disease type II." Am J Hum Genet. 62(4):991-4.**
2. **Burton BK et al. (2020). "Newborn Screening for Pompe Disease in Illinois: Experience with 684,290 Infants." Int J Neonatal Screen. 6(1):4.**
3. **Dardis A et al. (2014). "Functional characterization of the common c.-32-13T>G mutation of GAA gene: identification of potential therapeutic agents." Nucleic Acids Res. 42(2):1291-302.**
4. **Ficicioglu C et al. (2020). "Newborn Screening for Pompe Disease: Pennsylvania Experience." Int J Neonatal Screen. 6(4).**
5. **Fukuhara Y et al. (2018). "A molecular analysis of the GAA gene and clinical spectrum in 38 patients with Pompe disease in Japan." Mol Genet Metab Rep. 14:3-9.**
6. **Gal A et al. (2021). "Correlation of GAA Genotype and Acid-α-Glucosidase Enzyme Activity in Hungarian Patients with Pompe Disease." Life (Basel). 11(6).**
7. **Gregg AR et al. (2021). "Screening for autosomal recessive and X-linked conditions during pregnancy and preconception: a practice resource of the American College of Medical Genetics and Genomics (ACMG)." Genet Med. 23(10):1793-1806.**
8. **Hahn A et al. (2015). "Outcome of patients with classical infantile pompe disease receiving enzyme replacement therapy in Germany." JIMD Rep. 20:65-75.**
9. **Hahn SH et al. (2018). "Efficacy, safety profile, and immunogenicity of alglucosidase alfa produced at the 4,000-liter scale in US children and adolescents with Pompe disease: ADVANCE, a phase IV, open-label, prospective study." Genet Med. 20(10):1284-1294.**
10. **Hermans MM et al. (1993). "The conservative substitution Asp-645→Glu in lysosomal alpha-glucosidase affects transport and phosphorylation of the enzyme in an adult patient with glycogen-storage disease type II." Biochem J. 289 (Pt 3):687-93.**

See all references

Change Log

Your report may occasionally be updated based on new information. This Change Log describes updates and revisions to this report.

Date	Change
Aug. 24, 2022	Pompe Disease report created.

Development of the Pompe Disease report was supported in part by Sanofi. 23andMe retains sole responsibility for the final report content.

Pompe Disease

Pompe disease is a rare genetic disorder caused by the buildup of glycogen, a storage form of glucose, in muscles and other tissues. It is characterized by progressive muscle weakness that can lead to heart, breathing, and mobility problems. The age of onset and severity of symptoms can vary widely. A person must have two different variants in the GAA gene, or two copies of the same variant, in order to have this condition.

Overview Scientific Details Frequently Asked Questions

Pompe Disease

- What does this test do?
- What does this test **not** do?
- My report says **two copies of a variant** were detected. What does this mean?
- My report says people with my result are **at risk of developing symptoms of Pompe disease**. What does this mean?
- The report says the test includes variants common in people of African/African American and European descent. What if I'm not one of those ethnicities?
- My report says I have **two copies of a variant** linked to Pompe disease. What are some things I could do?
- How could my result affect my children?

Have more questions? **Check out our Customer Care Help Center.**

Development of the Pompe Disease report was supported in part by Sanofi. 23andMe retains sole responsibility for the final report content.