Pyruvate Kinase Deficiency

Pyruvate kinase (PK) deficiency is a rare genetic disorder in which red blood cells break down too quickly, leading to chronic anemia. A person must have two variants in the PKLR gene, or two copies of a variant, in order to have this condition.

Overview Scientific Details

Jamie, you do not have the variant we tested.

You could still have a variant not covered by this test.

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

Intended Uses

- To test for the R486W variant in the PKLR gene.
- To identify carrier status for PK deficiency.
- Informs individuals with two copies of the tested variant that they may be at risk of developing symptoms of PK deficiency.

Limitations

- Does **not test** for all possible variants for the condition. More than 300 variants in the PKLR gene have been linked to PK deficiency, and this report only includes one of those variants.

Important Ethnicities

- This test does **not** include the majority of PKLR variants that cause PK deficiency in any ethnicity.

You are not a carrier of the variant covered by this test.

However, this test does not include the majority of variants that cause PK deficiency in any ethnicity.

We ruled out the tested variant for PK deficiency.

However, you could still have a variant not included in this test. More than 300 variants in the PKLR gene have been linked to PK deficiency, and this report only includes one of those variants.

You still have a chance of being a carrier for PK deficiency.

We cannot estimate your chances because sufficient data is not available.

About Pyruvate Kinase Deficiency

Also known as: PK Deficiency, PKD

When symptoms develop

Symptoms can develop anytime from before birth to adulthood and can vary from mild to severe. Symptoms may worsen with age.

Typical signs and symptoms

- Chronic anemia
- Extreme fatigue and difficulty exercising
- Jaundice (yellowing of the skin and eyes)
- Cognitive difficulties such as difficulty concentrating
- Enlarged spleen
- Iron overload
- Gallstones

Ethnicities most affected

PK deficiency is found in people of many ethnicities. It is estimated that about 1 in 20,000 people of European descent has the condition. PK deficiency is more common in the Amish and Roma communities.

How it's treated

There is currently no known cure. Treatment depends on the severity of the symptoms and may include blood transfusions, medications to remove excess iron from the blood, and removal of the spleen and gallbladder. In newborns, phototherapy (light therapy) is often used to treat jaundice. Medications that increase the activity of the PK enzyme in red blood cells are also in development, as a way to treat the underlying cause of the condition.

Read more at: MedlinePlus National Organization for Rare Disorders Genetic and Rare Diseases Information Center

Consider talking to a healthcare professional if you are thinking about having children.

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

Learn more

If you have a family history of this condition or think you have symptoms, consult with a healthcare professional.

Print report

Learn more about this condition and connect with support groups.

Learn more

Development of the Pyruvate Kinase Deficiency report was supported in part by Agios Pharmaceuticals. 23andMe retains sole responsibility for the final report content.

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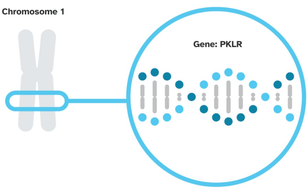
Overview Scientific Details

PK deficiency is caused by variants in the PKLR gene.

PKLR

The PKLR gene contains instructions for making an enzyme called pyruvate kinase, or PK. This enzyme is found primarily in red blood cells and liver cells, where it plays an important role in breaking down glucose to produce energy. Certain variants in the PKLR gene disrupt the function of the PK enzyme, leading to the premature destruction of red blood cells (called hemolytic anemia).

Read more at MedlinePlus



You have no variants detected by this test.

Variants Detected | View All Tested Markers

Marker Tested	Your Genotype*		Additional Information
R486W **Gene:** PKLR **Marker:** rs116100695	**G** Typical copy from one of your parents	**G** Typical copy from your other parent	**Biological explanation** **Typical vs. variant DNA sequence(s)** **Percent of 23andMe customers with variant** **References** [3, 4, 9, 11, 12, 13, 14, 15, 17, 18, 20] | ClinVar

*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

Post-test carrier risk for PK deficiency is the chance of still being a carrier for the condition if you do not have the variant tested. This chance depends on how common it is to be a carrier for PK deficiency and whether the variant we tested tends to be found in people of your ethnicity.

Because you do not have the variant we tested, your chances of still being a carrier may be lower than for someone who has not been tested. However, we cannot provide an exact estimate because the information needed to calculate post-test carrier risk is not available for your ethnicity.

Test Details

Indications for Use

The 23andMe PGS Carrier Status Test for Pyruvate Kinase Deficiency is indicated for the detection of the R486W variant in the PKLR gene. This test is intended to be used to determine carrier status for PK deficiency in adults. This report also describes if a result is associated with personal risk of developing symptoms of PK deficiency, but it does not describe a person's overall risk of developing symptoms.

Special Considerations

- Symptoms of PK deficiency may vary widely among people with the condition.
- This test does not include the majority of PKLR variants that cause PK deficiency in any ethnicity.
- There are currently no professional guidelines in the U.S. for carrier testing for this condition.

Test Performance Summary

Carrier Detection Rate & Relevant Ethnicities

The "carrier detection rate" is an estimate of the percentage of carriers for this condition that would be identified by this test. Carrier detection rate differs by ethnicity and is provided only where sufficient data is available.

Southern European	26 to 35%, depending on country of ancestry	[4, 11, 12, 13, 17, 18, 20]
Northern, Western, and Central European	8 to 17%, depending on region of ancestry	[10, 14, 16]
All other ethnicities	Expected to be <19%	[3]

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. Beutler E et al. (2000). "Estimating the prevalence of pyruvate kinase deficiency from the gene frequency in the general white population." Blood. 95(11):3585-8.
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4. Fermo E et al. (2005). "Red cell pyruvate kinase deficiency: 17 new mutations of the PK-LR gene." Br J Haematol. 129(6):835-46.
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8. Grace RF et al. (2019). "Safety and Efficacy of Mitapivat in Pyruvate Kinase Deficiency." N Engl J Med. 381(16):933-944.
9. Kung C et al. (2017). "AG-348 enhances pyruvate kinase activity in red blood cells from patients with pyruvate kinase deficiency." Blood. 130(11):1347-1356.
10. Lenzner C et al. (1997). "Molecular analysis of 29 pyruvate kinase-deficient patients from central Europe with hereditary hemolytic anemia." Blood. 89(5):1793-9.

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
March 17, 2021	Pyruvate Kinase Deficiency report created.

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