Hereditary Prostate Cancer (HOXB13-Related)

HOXB13-related hereditary prostate cancer is caused by a specific genetic variant in the HOXB13 gene. This variant is associated with an increased risk of developing prostate cancer and is most commonly found in people of European descent, especially people of Northern European descent.

Overview Scientific Details Frequently Asked Questions

Jamie, you have an **increased risk** of developing prostate cancer.

You have the genetic variant we tested. Males with this variant have an increased risk of developing prostate cancer.

1 variant detected

in the HOXB13 gene

Please share your result with a healthcare professional. Results should be confirmed by an independent genetic test prescribed by your own healthcare provider before taking any medical action.

How To Use This Test

This test does not diagnose cancer or any other health conditions and should not be used to make medical decisions. Results should be confirmed by an independent genetic test prescribed by your own healthcare provider before taking any medical action.

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

Review the Hereditary Prostate Cancer (HOXB13-Related) tutorial

See Frequently Asked Questions

See Scientific Details for complete Indications for Use statement and full list of Warnings, Precautions, and Limitations

Intended Uses

- Tests for the **G84E** variant in the HOXB13 gene. This variant is associated with an increased risk of developing prostate cancer.
- For males: Provides information on whether their genetic result is associated with an increased risk for prostate cancer.
- For females: Provides information on whether they have the tested variant, which means that their male relatives may be at increased risk for HOXB13-related prostate cancer.

Limitations

- Does **not** test for all possible variants in the HOXB13 gene.
- Does **not** test for variants in other genes linked to hereditary prostate cancer, such as variants in BRCA1, BRCA2, and genes linked to Lynch syndrome.
- Does **not** account for non-genetic factors, like environment and lifestyle, that influence overall prostate cancer risk.
- The interpretation of your genetic result depends on the birth sex you reported in your account settings.

Ethnicity Considerations

- The variant included in this test is most commonly found in people of **European** descent, especially in people of **Northern European** descent.

You have an **increased risk** of developing prostate cancer based on your result.

It is important to talk with a healthcare professional about this result. It is also important to confirm this result with an independent genetic test prescribed by your own healthcare provider before taking any medical action.

We detected the G84E variant in the HOXB13 gene.

See Scientific Details

Males with this variant have an **increased risk** of developing prostate cancer.

Studies suggest that 33–53% of males with the G84E variant develop prostate cancer by age 89, compared to about a 13% lifetime risk for males in the general population. People with this variant who develop prostate cancer also tend to do so at an earlier age. Exact risks depend on family history and other factors.

See Scientific Details

Since you share DNA with your family members, they may be interested in your result.

Your parents and any siblings and children each have a 50% chance of having the variant we detected. If your male family members also have this variant, they have an increased risk of developing prostate cancer. If you are thinking about sharing your results with family members, **see this article** for a discussion about things to consider before having the conversation. **Genetic counselors** can help your adult family members decide about genetic testing.

There are things you can do to manage your risk for prostate cancer.

Males with the G84E variant included in this test have an increased risk of developing prostate cancer. But there are options to consider to help manage your risk for prostate cancer, so it's important to talk with your doctor about your result. Genetic counseling can also help you understand your results and options. For more information and possible next steps, see this **help article**.

Know your family history

Males with a family history of prostate cancer have a higher risk of developing prostate cancer than those without a family history. By knowing your family history, a healthcare professional can better assess your risk.

Understand your screening options

National guidelines for prostate cancer screening vary, but some guidelines recommend earlier prostate cancer screening in people with your genetic result. Your doctor can help you find a screening strategy that's right for you.

Maintain a healthy lifestyle

In general, maintaining a healthy weight may reduce the risk for prostate cancer. However, more research is needed to fully understand the impact of this and other lifestyle factors on prostate cancer risk in people with your genetic result.

Results should be confirmed by an independent genetic test prescribed by your own healthcare provider before taking any medical action.

See Scientific Details for more information

About Hereditary Prostate Cancer (HOXB13-Related)

The G84E variant in the HOXB13 gene is associated with an increased risk for prostate cancer.

Lifetime prostate cancer risk

Males with the HOXB13 G84E variant have a 33–53% chance of developing prostate cancer by age 89, compared to about a 13% lifetime risk for males in the general population. **See Scientific Details to learn more about these risks.**

When prostate cancer develops

In general, the chances of developing prostate cancer increase with age. However, males with the HOXB13 G84E variant may develop prostate cancer at an earlier age.

How common is the HOXB13 G84E variant?

Up to 1 in 78 people of European descent has the HOXB13 G84E variant. This variant is expected to be less common in people of other ethnicities.

Prostate cancer screening

National guidelines for prostate cancer screening vary. Some guidelines recommend earlier prostate cancer screening in people with the HOXB13 G84E variant.

A healthcare professional can help you find an appropriate screening strategy. Always consult with a healthcare professional before taking any medical action.

Read more at: MedlinePlus American Cancer Society

It is important to discuss this result with a healthcare professional.

It's important to consult with a healthcare professional to confirm your result and discuss options for cancer screening.

Print report

If you have questions about your results or how they might affect you or your family, a genetic counselor may be able to help.

Learn more

See our Frequently Asked Questions for more information.

FAQs

Start taking action →

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Hereditary Prostate Cancer (HOXB13-Related)

HOXB13-related hereditary prostate cancer is caused by a specific genetic variant in the HOXB13 gene. This variant is associated with an increased risk of developing prostate cancer and is most commonly found in people of European descent, especially people of Northern European descent.

Overview | Scientific Details | Frequently Asked Questions

The G84E variant in the HOXB13 gene is associated with an increased risk for prostate cancer.

This report does not include variants in other genes associated with increased prostate cancer risk.

HOXB13

The HOXB13 gene contains instructions for making a protein that helps regulate the expression of other genes. The HOXB13 protein acts as a tumor suppressor, preventing cells from growing and dividing too rapidly. Although the exact mechanism is not well understood, the G84E variant in the HOXB13 gene increases the risk for prostate cancer.

Read more at MedlinePlus*

You have the G84E variant we tested.

Variants Detected | View All Tested Markers

Marker Tested	Genotype*		Additional Information
G84E Gene: HOXB13 Marker: rs138213197	C Typical copy from one of your parents	T Variant copy from your other parent	Biological explanation Typical vs. variant DNA sequence(s) Percent of 23andMe customers with variant References [1, 7, 9, 13, 19] | ClinVar*

* The percent of 23andMe customers with a variant may not be representative of the general population.

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

This report provides risk estimates for prostate cancer associated with the HOXB13 G84E variant. This test does not take into account non-genetic factors that influence overall prostate cancer risk.

Health Risk Estimates

Risk estimates are based on clinical studies that identify an association between a genotype and a health condition.

Numerical risk estimates are not available for people who have two copies of the HOXB13 G84E variant. An interpretation of "increased risk" is provided to males with this result. It is likely that their risk is at least as high as the risk for males with just one copy of the variant. More research is needed to understand the risk associated with this result.

Consider talking to a healthcare professional if you have any concerns about your results.

References [1, 9, 13, 16]

Lifetime risk | Risk by age

The risk estimates for prostate cancer shown below represent the proportion of males expected to develop prostate cancer during their lifetime (for the general population) or by age 69 (for those with the HOXB13 G84E variant). Estimates for the general population are based on observed prostate cancer among males in the United States. Estimates for males with the HOXB13 G84E variant are based primarily on studies of people of European descent.

	General population	HOXB13 G84E variant (one copy)
Prostate cancer	12.6%	33–53%

See risk estimates by ethnicity for the general U.S. population

Other Factors

Many factors are known to influence the risk of developing prostate cancer in the general population. In males with the HOXB13 G84E variant, the effects of most of these factors on prostate cancer risk are not as well understood.

This is not a complete list of other factors. Except for age and family history, the effects of these factors on prostate cancer risk in males with the HOXB13 G84E variant are not as well understood.

People with multiple risk factors may have a higher risk of developing prostate cancer.

Consult with a healthcare professional before making any major lifestyle changes.

Other Factors	References
Age In general, the risk of developing prostate cancer increases with age. However, males with the HOXB13 G84E variant may develop prostate cancer at an earlier age.	[4, 16]
Family History People with the HOXB13 G84E variant who also have a family history of prostate cancer have a higher risk of developing prostate cancer themselves. The risk is even greater for people with more than one affected family member and for those who have relatives diagnosed at an earlier age. This increased risk is likely due to shared genetic and non-genetic factors.	[3, 5, 9, 13]
Ethnicity In general, African Americans have a greater risk of developing prostate cancer than people of other ethnicities. In the U.S., more than 1 in 6 African American males develops prostate cancer by the age of 68, compared to about 1 in 8 males of European descent. African Americans are also more likely to develop prostate cancer at an earlier age. This difference may be due to a combination of genetic, environmental, and lifestyle factors.	[3, 5, 16]
Other genetic variants Other genetic variants seem to influence prostate cancer risk in males with the HOXB13 G84E variant. In combination, these other variants may increase or decrease a person's risk for prostate cancer compared to other people with the HOXB13 G84E variant. Scientists are still working to understand how these other variants modify prostate cancer risk.	[3, 9]
Obesity Among males in the general population, some studies have found that those who are overweight or obese are more likely to develop aggressive forms of prostate cancer.	[10, 11, 15]
Smoking In the general population, smoking is associated with an increased risk of dying from prostate cancer. The effect of smoking on the risk of developing prostate cancer is less clear.	[8]

Prostate Cancer Screening Guidelines

Cancer screening can help detect certain cancers at an earlier stage, when they may be more treatable. The guidelines below apply to males with the HOXB13 G84E variant. These guidelines may help you and your doctor decide on the best screening plan for you.

Screening guidelines for prostate cancer vary, but some guidelines recommend earlier prostate cancer screening in males with your genetic result. Your doctor can help you find a screening strategy that's right for you.

It is Important to talk with a healthcare professional, especially if you have a personal or family history of prostate cancer.

Test Details

Indications for Use

The 23andMe Personal Genome Service (PGS) uses qualitative genotyping to detect select clinically relevant variants in genomic DNA isolated from human saliva collected from individuals ≥18 years for the purpose of reporting and interpreting genetic health risks, including the 23andMe PGS Genetic Health Risk Report for Hereditary Prostate Cancer (HOXB13-Related). The 23andMe PGS Genetic Health Risk Report for Hereditary Prostate Cancer (HOXB13-Related) is indicated for reporting of the G84E variant in the HOXB13 gene. The report describes if a person has the G84E variant and if a male is at increased risk for prostate cancer. The variant included in this report is most common in people of European descent. The test report does not describe a person's overall risk of developing any type of cancer, and the absence of a variant tested does not rule out the presence of other variants that may be cancer-related. This test is not a substitute for visits to a healthcare provider for recommended screenings or appropriate follow-up and should not be used for diagnosis or to determine any treatments or medical interventions.

Special Considerations

- Genetic testing for the HOXB13 G84E variant in the general population is not currently recommended by any healthcare professional organizations.
- Prostate cancer risk associated with the HOXB13 G84E variant varies from person to person. Overall risk depends on family history and other factors.

Test Performance Summary

Clinical Performance [9, 19]

The variant included in this report is associated with an increased risk of developing prostate cancer. However, not everyone with this variant develops prostate cancer. In addition, most cases of prostate cancer are not caused by inherited genetic variants.

- The HOXB13 G84E variant accounts for up to 5% of hereditary prostate cancer in families of European descent. In some Scandinavian countries this variant accounts for about 22% (Finland) and 8% (Sweden) of hereditary prostate cancer cases.
- Up to 1 in 79 people of European descent has the HOXB13 G84E variant. This variant is expected to be less common in people of other ethnicities.

Analytical Performance

Accuracy was determined by comparing results from this test with results from sequencing. Greater than 99% of test results were correct. The 95% confidence interval for the total number of samples tested was 83.2% to 99.9%. While unlikely, this test may provide false positive or false negative results. It is possible that the presence of certain mutations in your sample may interfere with the performance of this test. The effects of the interfering mutations on the performance of this test have not been studied. For more details on the analytical performance of this test, refer to the package insert.

Warnings, Precautions, and Limitations

- This test does not diagnose cancer or any other health conditions and cannot determine your overall risk of developing cancer in the future.
- This test should not be used to make medical decisions. Results should be confirmed by an independent genetic test prescribed by your own healthcare provider before taking any medical action.
- This test does not cover all variants that could increase risk for cancer.* The absence of a variant tested does not rule out the presence of other genetic variants that may impact cancer risk.
- Other factors, such as environmental and lifestyle risk factors, may affect your risk of developing cancer. This test does not account for those factors, and does not test for variants in other genes linked to hereditary cancers.
- Your ethnicity may affect how relevant this test is for you. The variant included in this test is most commonly found in people of European descent, especially in people of Northern European descent.
- This test is intended to provide you with genetic information to inform conversations with your doctor or other healthcare professional.
- This device is not intended for prenatal testing.
- This test should not be used to assess the presence of genetic variants that may impact response to medications.
- This test is not intended to detect the presence of deterministic variants in autosomal dominant diseases or conditions.
- This test is not a substitute for visits to a healthcare professional for recommended screenings. Consult with a healthcare professional if you have any questions or concerns about your results or your current state of health.
- Some people feel a little anxious after getting genetic health risk results. This is normal. If you feel very anxious, you should speak to your doctor or a genetic counselor.

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

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

References

1. **Akbari MR et al. (2012).** "Association between germline HOXB13 G84E mutation and risk of prostate cancer." J Natl Cancer Inst. 104(16):1260-2. *
2. **Decker B et al. (2014).** "Dysregulation of the homeobox transcription factor gene HOXB13: role in prostate cancer." Pharmagenomics Pers Med. 7:193-201. *
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4. **Ewing CM et al. (2012).** "Germline mutations in HOXB13 and prostate-cancer risk." N Engl J Med. 366(2):141-9. *
5. **Gann PH. (2002).** "Risk factors for prostate cancer." Rev Urol. 4 Suppl 5:S3-S10. *
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8. **Islami F et al. (2014).** "A systematic review and meta-analysis of tobacco use and prostate cancer mortality and incidence in prospective cohort studies." Eur Urol. 66(6):1054-64. *
9. **Kartsson R et al. (2014).** "A population-based assessment of germline HOXB13 G84E mutation and prostate cancer risk." Eur Urol. 65(1):169-76. *
10. **Lauby-Secretan B et al. (2016).** "Body Fatness and Cancer—Viewpoint of the IARC Working Group." N Engl J Med. 375(8):794-8. *

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 22, 2023	Hereditary Prostate Cancer (HOXB13-Related) report created.

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Hereditary Prostate Cancer (HOXB13-Related)

What does this test do?

What does this test **not** do?

Who is at risk for prostate cancer?

The report says the variant included in this test is most common in people of **European** descent, especially in people of **Northern European** descent. What if I'm not of European descent?

Where can I learn more about prostate cancer, support groups, and other resources?

My report says **one variant** called **G84E** was detected. What does this mean?

What does **increased risk** mean?

My report says that males with the HOXB13 G84E variant have a **33–53% chance** of developing prostate cancer during their lifetime. What do those percentages mean? And why is there such a large range?

My report says **one variant** called **G84E** was detected in the HOXB13 gene. What are some things I could do?

How could my result affect my family?

I have questions about my results. Who should I talk to?

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

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