Age-Related Macular Degeneration

Age-related macular degeneration (AMD) is the most common cause of irreversible vision loss among older adults. The disease results in damage to the central part of the retina (the macula), impairing vision needed for reading, driving, or even recognizing faces. This test includes the two most common variants associated with an increased risk of developing the condition.

Overview Scientific Details Frequently Asked Questions

Jamie, you have **one** of the two genetic variants we tested.

However, you are not likely at increased risk of developing AMD based on your genetic result. Lifestyle and other factors may also influence your risk.

How To Use This Test

This test does not diagnose AMD or any other 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 Genetic Health Risk tutorial
See Scientific Details
See Frequently Asked Questions

Intended Uses

- Tests for the **Y402H** variant in the CFH gene and the **A69S** variant in the ARMS2 gene associated with an increased risk of developing AMD.

Limitations

- Does **not** test for all possible variants associated with an increased risk of developing AMD.
- Does **not** test for variants in other genes associated with an increased risk of developing AMD.

Important Ethnicities

- The variants included in this test are common in many ethnicities, but are best studied in people of **European** descent.

You are **not likely at increased risk** of developing AMD based on your genetic result.

Lifestyle and genetic factors not covered by this test also affect your chances of developing AMD.

We detected the Y402H variant in the CFH gene.

See Scientific Details

People with only one copy of this variant are not likely at increased risk of developing AMD.

In the U.S., about 2% of people over the age of 50 have AMD. Based on your genetic result, your risk is likely not very different from the general population risk.

See Scientific Details

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

At least one of your parents is also expected to have this variant. In addition, each of your siblings has at least a 50% chance of having this variant, and each of your children has a 50% chance of inheriting this variant from you.

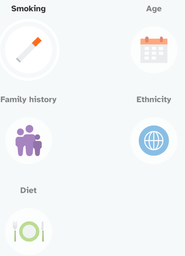
Lifestyle and other factors can also influence the chances of developing AMD.

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

Smoking

Smoking is associated with higher risk of developing AMD. If you smoke, quitting is one of the easiest ways to reduce your risk.

See Scientific Details for more information



About Age-Related Macular Degeneration

Also known as: Age-related maculopathy, AMD, ARMD

When it develops

AMD is rarely diagnosed in people under the age of 50. Vision loss related to AMD usually becomes noticeable in a person's 60s or 70s and tends to worsen over time.

How common is the condition?

In the U.S., about 2% of people over the age of 50 have AMD. Approximately 2 million Americans are currently living with AMD.

Typical signs and symptoms

- Blurred or distorted vision
- Vision loss
- Yellow fatty deposits in the retina called "drusen"
- Blood or fluid leakage in the retina

How it's treated

There is currently no known prevention or cure for AMD. Having regular eye exams can help detect early signs of the condition. Certain treatments, medications, and supplements may slow the progression of AMD.

Read more at: National Eye Institute NCBI: Age-Related Macular Degeneration Cleveland Clinic MedlinePlus

Learn more about AMD.

See our Frequently Asked Questions for more information.

FAQs

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

Print report

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Overview | Scientific Details | Frequently Asked Questions

AMD is associated with variants in many genes.

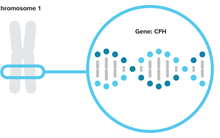
This report includes one variant in the CFH gene and one variant in the ARMS2 gene. This test does not cover variants in other genes associated with AMD.

CFH | ARMS2

The CFH gene provides instructions for making a protein called complement factor H. This protein is part of the immune system that helps the body fight foreign invaders such as bacteria and viruses. It is important for the body to regulate this system so that healthy cells are not destroyed unnecessarily. Complement factor H, together with other related proteins, helps regulate this system by turning it off when it is not needed.

Read more at MedlinePlus*

Chromosome 1



You have one of the two genetic variants we tested.

Variants Detected | View All Tested Markers

Marker Tested	Genotype*		Additional Information
Y402H **Gene:** CFH **Marker:** rs1061170	**C** Variant copy from one of your parents	**T** Typical copy from your other parent	Biological explanation Typical vs. variant DNA sequence(s) Percent of 23andMe customers with variant References [4, 6, 19, 15, 24, 25, 26, 32, 33] | 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

This report provides risk estimates for people of European descent. Estimates for other ethnicities are not currently available.

Health Risk Estimates

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

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

References [24]

Likelihood ratios | Odds ratios

A "likelihood ratio" estimates how the test result affects the chances of a condition, compared to the chances of the condition prior to testing. In the table below, values greater than 1 mean that the chances of developing AMD are higher based on the test result. Values less than 1 mean that the chances are lower based on the test result. Values close to 1 mean that the chances of developing AMD have not changed significantly.

These values are calculated by 23andMe using data from Rivera et al. (2005).

Genotype	Likelihood ratio	95% confidence interval
No variants detected	0.23	0.17 - 0.39
One copy of Y402H variant	0.59	0.42 - 0.59
One copy of A69S variant	0.67	0.51 - 0.88
Two copies of Y402H variant	1.64	1.25 - 2.14
Two copies of A69S variant	1.99	1.16 - 3.38
One copy of Y402H and one copy of A69S variant	1.24	1.03 - 1.59
One copy of Y402H and two copies of A69S variant	4.12	2.69 - 6.53
Two copies of Y402H and one copy of A69S variant	4.49	3.18 - 6.33
Two copies of Y402H and two copies of A69S variant	21.79	6.87 - 68.59

Other Factors

Other factors besides the variants included in this test can influence your chances of developing AMD.

This is not a complete list of other factors.

People with several risk factors, including having multiple genetic variants, may have a higher risk of developing AMD.

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

Other Factors	References
Smoking In general, smoking increases the risk of developing AMD. For people who have multiple risk variants, smoking might further increase their risk. Professional guidelines recommend quitting smoking to reduce AMD risk.	[1, 8, 28, 30]
Age The risk of developing AMD increases greatly as a person ages. About 1% of the general U.S. population between the ages of 55 and 79 have AMD. Over the age of 80, 2-14% of people have AMD, depending on ethnicity.	[21]
Family history First-degree relatives of a person with AMD have a higher chance of developing AMD themselves. This may primarily be explained by genetic factors, but could also be related to family members sharing a similar lifestyle.	[13, 14, 29]
Ethnicity People of European descent are more likely to develop AMD than people of other ethnicities. In the US, 2.5% of people of European descent over age 59 have AMD. By comparison, less than 1% of people of African American, Hispanic, and Asian descent over age 59 have the condition.	[21]
Diet Understanding the effects of diet on the risk of AMD is an active area of research. The American Academy of Ophthalmology advises individuals to eat healthy foods that have also been shown to benefit eye health. A healthy diet for the eyes emphasizes the consumption of dark green leafy vegetables, citrus fruits, nuts, and whole grains. Consuming healthy fats — found in fish, nuts, and olive oil — and minimizing saturated and trans fats are also important. Evidence suggests that following a Mediterranean diet may reduce AMD progression.	[3, 5, 8, 12]
Sunlight exposure The effect of sunlight exposure on the risk for AMD is still an active area of research. However, for general eye health, professional organizations recommend wearing sunglasses when outdoors to protect the eyes from harmful exposure to the sun.	[7, 22, 27, 31]
Other genes There are other genes and variants that have been linked to AMD. However, many of these variants may have only a small effect on risk on their own.	[23]

Test Details

Indications for Use

The 23andMe PGS Genetic Health Risk Report for Age-Related Macular Degeneration (AMD) is indicated for reporting of the Y402H variant in the CFH gene and the A69S variant in the ARMS2 gene. This report describes if a person's genetic result is associated with an increased risk of developing AMD, but does not describe a person's overall risk of developing AMD. This report is most relevant for people of European descent.

Special Considerations

- Genetic testing for AMD is not currently recommended by any healthcare professional organizations.

Test Performance Summary

Clinical Performance [9, 26]

- The Y402H variant in the CFH gene is expected to be responsible for approximately 43% of all cases of AMD in older adults.
- The A69S variant in the ARMS2 gene is expected to be responsible for approximately 36% of all cases of AMD in older adults.

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.
- 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. **Age-Related Eye Disease Study Research Group. (2000). "Risk factors associated with age-related macular degeneration. A case-control study in the age-related eye disease study: Age-Related Eye Disease Study Report Number 3." Ophthalmology. 107(12):2224-32.** ^
2. **Age-Related Eye Disease Study Research Group. (2001). "A randomized, placebo-controlled, clinical trial of high-dose supplementation with vitamins C and E, beta carotene, and zinc for age-related macular degeneration and vision loss: AREDS report no. 8." Arch Ophthalmol. 119(10):1417-36.** ^
3. **American Academy of Ophthalmology (2013, May 24). "Diet and Nutrition." Retrieved May 31, 2017, from https://www.aao.org/eye-health/tips-prevention/diet-nutrition** ^
4. **Bergeron-Sawitzke J et al. (2009). "Multilocus analysis of age-related macular degeneration." Eur J Hum Genet. 17(9):1190-9.** ^
5. **Carneiro A et al. (2017). "Nutritional and Lifestyle Interventions for Age-Related Macular Degeneration: A Review." Oxid Med Cell Longev. 2017:6469138.** ^
6. **Clark SJ et al. (2010). "Impaired binding of the age-related macular degeneration-associated complement factor H 402H allotype to Bruch's membrane in human retina." J Biol Chem. 285(39):30192-202.** ^
7. **Cruickshanks KJ et al. (1993). "Sunlight and age-related macular degeneration. The Beaver Dam Eye Study." Arch Ophthalmol. 111(4):514-8.** ^
8. **Flaxel CJ et al. (2020). "Age-Related Macular Degeneration Preferred Practice Pattern®." Ophthalmology. 127(1):P1-P65.** ^
9. **Haines JL et al. (2005). "Complement factor H variant increases the risk of age-related macular degeneration." Science. 308(5720):419-21.** ^
10. **Jabbarpoor Bonyadi MH et al. (2020). "Association of combined complement factor H Y402H and ARMS2/LOC387715 A69S polymorphisms with age-related macular degeneration: an updated meta-analysis." Ophthalmic Genet. 41(4):391-397.** ^

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, 2017	Age-Related Macular Degeneration report created.

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Age-Related Macular Degeneration

I read that there are two types of AMD, the "dry" type and the "wet" type. Do the risks associated with these variants apply to both types of AMD?

What does this test do?

What does this test **not** do?

The report says the variants included in this test are best studied in people of **European** descent. What if I'm not of European descent?

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

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

My report says **one variant** was detected. What are some things I could do?

What does **not likely at increased risk** mean?

How could my result affect my family?

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