Eye Color

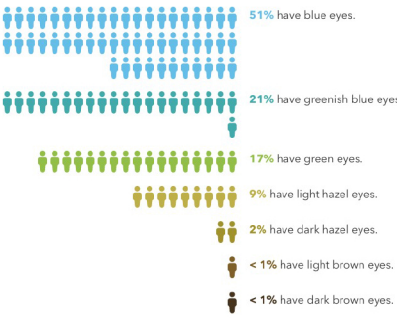
The ancient origins of eye colors

Early humans had brown eyes. But at some point in history, a baby was born with a genetic variant leading to a strange new eye color. Today, most light-eyed people carry that same genetic variant.

Your Traits Result

kary_mullis, your genetics make you most likely to have **blue or green eyes.**

Of 23andMe research participants with genetics like yours:



What color are your eyes?

How did we calculate your result?

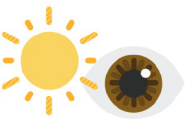
We looked at a place in your DNA (a genetic marker) that affects your chances of having light or dark eyes. Your combination of variants at this marker is usually found in people with blue or green eyes.

See Scientific Details

More about eye color

What gives your eyes their color?

The color of your eyes depends on how much eumelanin they have. Eumelanin is a brown pigment molecule. It looks dark because it absorbs the sunlight – so more eumelanin leads to darker eyes. It's also the same molecule that colors your hair and skin, though different genetic factors can affect how much brown pigment you have in each place.



Genetics

The genetic marker in this report is located near a gene called OCA2 that affects how much brown pigment your cells produce. People with 1 or 2 copies of the A variant of this marker tend to have more brown pigment in their eyes, so they are likely to have darker eyes.

Genetic result	What it means
AA	Likely brown or hazel eyes
AG	Likely brown or hazel eyes
GG	Likely blue or green eyes

Other factors that affect eye color

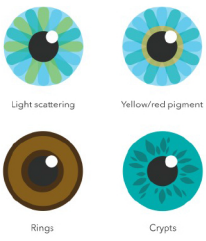
Brown pigment is only part of the story. What else makes your eyes unique?

Light scattering: There's no blue pigment in blue eyes. Instead, this color shows up in people with almost no brown pigment because of blue wavelengths of light that hit the eye and scatter back.

Yellow/red pigment: A yellow/red pigment molecule called pheomelanin can combine with different levels of blue light scattering and brown pigment to create green and hazel.

Rings: Some people have a darker ring around the inner edge of the iris. Almost everyone has a dark ring around the outer edge of the iris called the limbal ring.

Crypts: Some people have gaps, called crypts, between the cells in one of the layers of their irises. This can give the iris a marbled or starburst look.



Keep exploring your Traits results.

Contribute
Join the research effort and contribute to new discoveries.

Compare
Compare your results to your family and friends.

Discuss
Join the discussion with other 23andMe customers interested in Traits.

Eye Color

Scientific Details

We use one of two different methods to calculate your trait results.

Statistical Model

Most traits are influenced by many different factors, including genetics, lifestyle, and environment. Usually, a statistical model using many factors provides better predictions than looking at single factors by themselves. To develop our models, we first identify genetic markers associated with a trait using data from tens of thousands of 23andMe customers who have consented to research. Then, we use statistical methods to generate a "score" for that trait using your genotype at the relevant genetic markers as well as your age and sex. We predict your likelihood of having different versions of the trait based on the survey responses of 23andMe customers with similar scores. These predictions apply best to customers who are of the same ethnicity as the people whose data contributed to the model. The accuracy of these predictions varies from trait to trait.

Read more about our statistical methodology

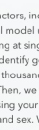
Curated Model

For some traits, just a few genetic markers can strongly predict whether a person will have a particular version of the trait. For curated models, we first evaluate published scientific studies to identify genetic markers with well-established associations with the trait. Then, we look at genetic and survey data from tens of thousands of 23andMe customers who have consented to research. We estimate your likelihood of having different versions of the trait based on survey responses from customers who are genetically similar to you at those markers. These results apply best to customers who are of the same ethnicity as the people whose data contributed to the predictions.

About your Eye Color result

Your result for this trait was calculated using a **curated model**.

Variants Detected | View All Tested Markers

Marker Tested	Genotype*			Additional information
rs12913832 **Gene:** Near OCA2 **Marker:** rs12913832	**G** Variant copy from one of your parents		**G** Variant copy from your other parent	**Biological explanation** **Typical vs. variant DNA sequence(s)** **Percent of 23andMe customers with variant** **References** [2, 11, 13]

*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.

References

1. Beleza S et al. (2013). "Genetic architecture of skin and eye color in an African-European admixed population." PLoS Genet. 9(3):e1003372.
2. Eiberg H et al. (2008). "Blue eye color in humans may be caused by a perfectly associated founder mutation in a regulatory element located within the HERC2 gene inhibiting OCA2 expression." Hum Genet. 123(2):177-87.
3. Hirobe et al. (2011.) "The mouse pink-eyed dilution allele of the P-gene greatly inhibits eumelanin but not pheomelanin synthesis." Pigment Cell Melanoma Res. 24;241-6.
4. Larsson M et al. (2011). "GWAS findings for human iris patterns: associations with variants in genes that influence normal neuronal pattern development." Am J Hum Genet. 89(2):334-43.
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6. Liu F et al. (2009). "Eye color and the prediction of complex phenotypes from genotypes." Curr Biol. 19(5):R192-3.
7. Liu F et al. (2010). "Digital quantification of human eye color highlights genetic association of three new loci." PLoS Genet. 6(5):e1000934.
8. Peshek D et al. (2011). "Preliminary evidence that the limbal ring influences facial attractiveness." Evol Psychol. 9(2):137-46.
9. Prota G et al. (1998) "Characterization of melanins in human irides and cultured uveal melanocytes from eyes of different colors." Exp Eye Res. 67:293-9.
10. Sturm RA and Frudakis TN. (2004). "Eye colour: portals into pigmentation genes and ancestry." Trends Genet. 20(8):327-32.

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
Dec. 15, 2017	Eye Color report updated with revised content and design.
June 22, 2017	Eye Color report separated from the Facial Features report.
May 12, 2016	Customers with a "Not Determined" genotype for the genetic marker used for Eye Color previously received a result for that trait based on the typical genotype. These customers will now receive a "Not Determined" result.
Oct. 21, 2015	Facial Features report created.