6. Eye color

Summary

1. Problem statement

In certain human populations, genetics allows predicting inheritance of eye color among family members. In other populations of the present day World, nearly everyone has the same eye color. What information is it possible to determine about the eye colors in both distant and close ancestors, descendants, and relatives of one living person?

● 2. Introduction

Did you know that no two people have the 'exact' same eye color?

Or that every person with blue eyes can be traced back to the same ancestor that lived in the black sea region about 10,000 years ago? It's true. Everyone alive today with blue eyes has a very specific DNA sequence.

The iris color is determined by the amount of **melanin pigmentation**. The more pigment there is, the darker the iris will be. Blue, gray, and green eyes are lighter because there is less melanin inside the iris.

Depending on where a person is born, eye color demographics can vary wildly. For instance, nearly all persons of African and Asian ancestry have brown eyes.

Among the genes that affect eye color, OCA2 and HERC2 stand out. Both of these genes are found in the human chromosome 15.

2. Introduction

Human cells carry two copies of each chromosome. These different versions of a gene are called **alleles**.
Alleles can be **dominant** or **recessive**.

Dominant - show their effect even if the individual only has one copy of the allele
Recessive - show their effect if the individual has two copies of the allele

The alleles for **brown** eyes are dominant over blue and green.
Green is dominant over blue but recessive to brown.
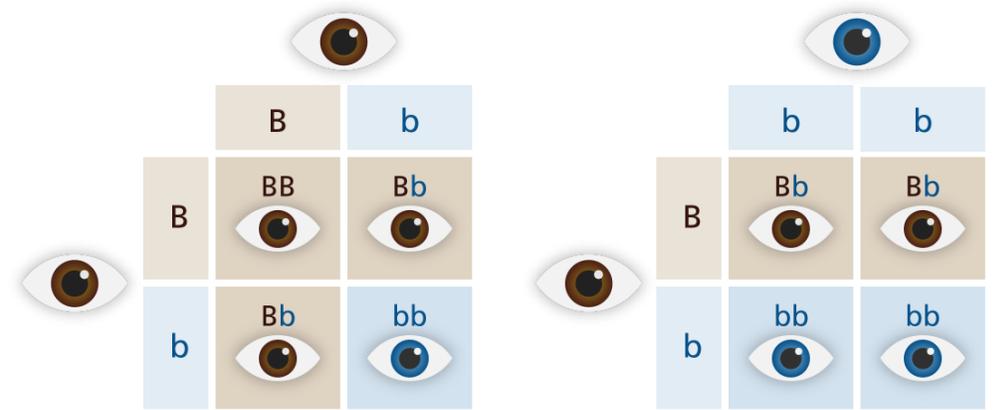
B – dominant brown eye allele
b – recessive blue eye allele

BB   brown eyes
Bb   brown eyes
bb   blue eyes

Parent 1	Parent 2		Likelihood of baby's eye color		
brown	brown	=	75%	19%	7%
brown	blue	=	50%	50%	0%
brown	green	=	50%	12%	38%
blue	blue	=	0%	99%	1%
blue	green	=	0%	50%	50%
green	green	=	<1%	25%	75%
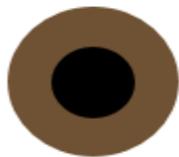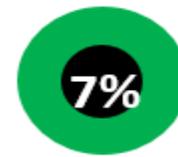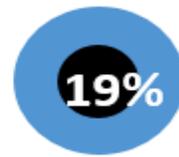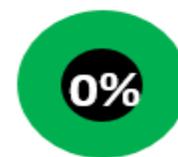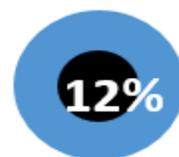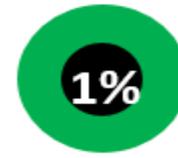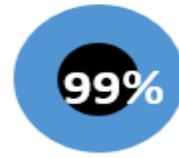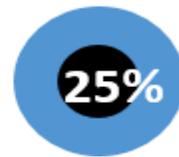
2. Introduction

Eyes color distribution in Europe

Percentage of light eyes in Europe © Eupedia.com

80% or more | 50 - 79% | 20 - 49% | 1 - 19%
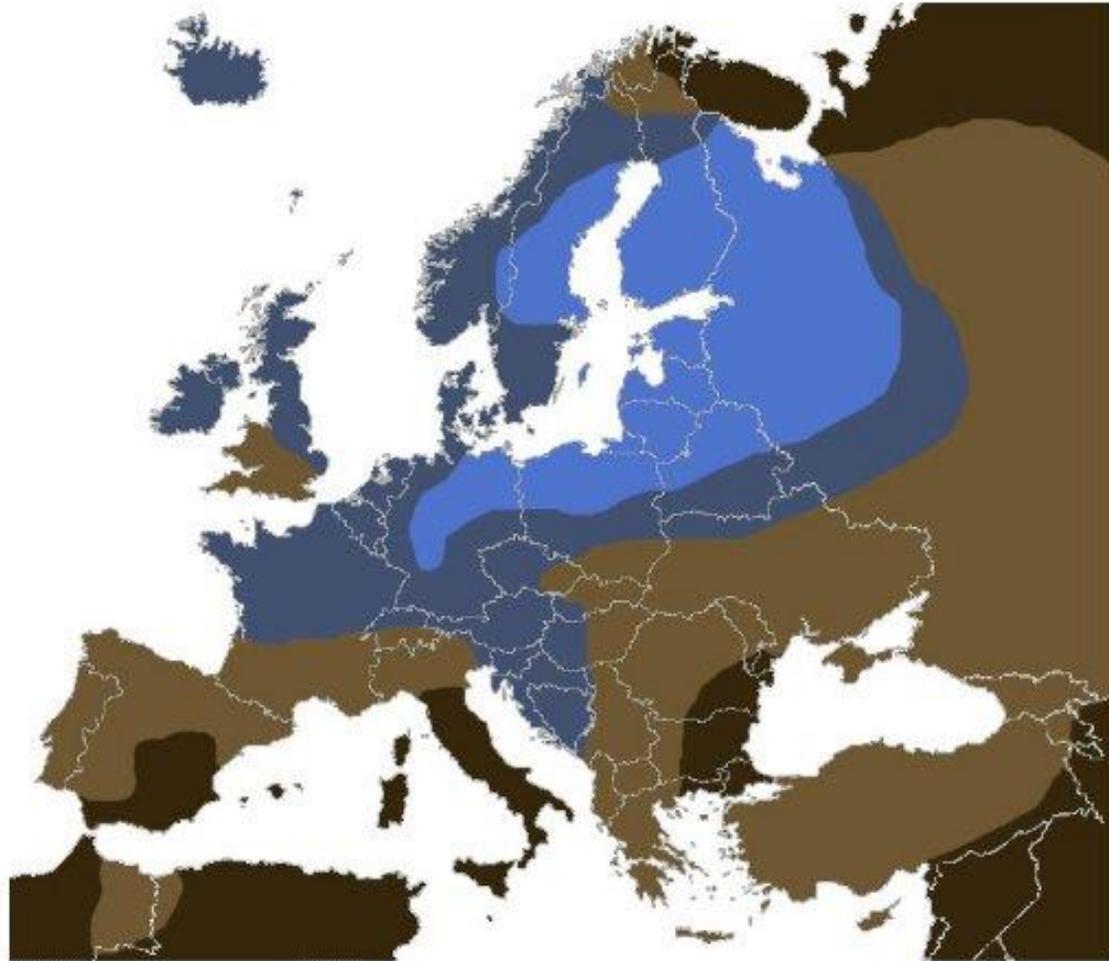
The map shows the percentage of people with blue eyes in Europe. The blues eyes are most common in northern Europe, while less common in the southern part.

The **western part of Bulgaria** has a higher percentage of blue eyed people (**20-49%**) and in the **eastern part of the country** blue eyes are less common (**1-19%**).

3. Materials, methods and experiment

- Everyone of our team tried to collect information about the color of eyes of their ancestors

- Statistical approach was decided

4. Results and discussion

The result of our research is a genealogical tree of eyes.
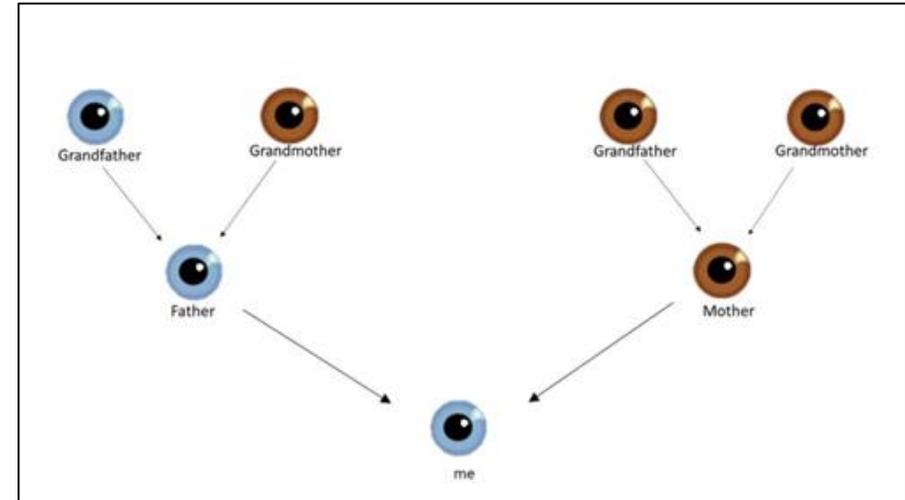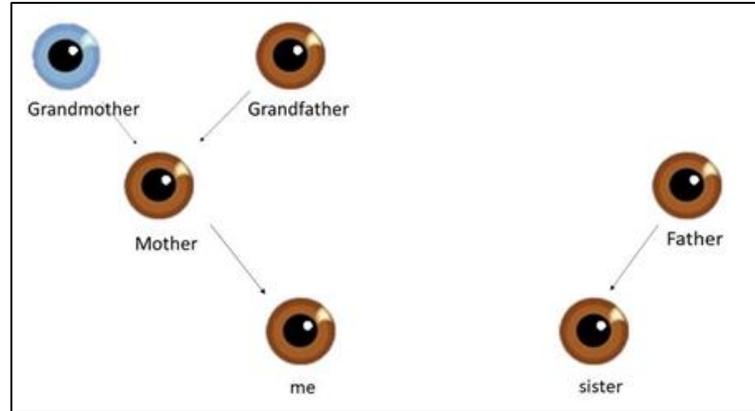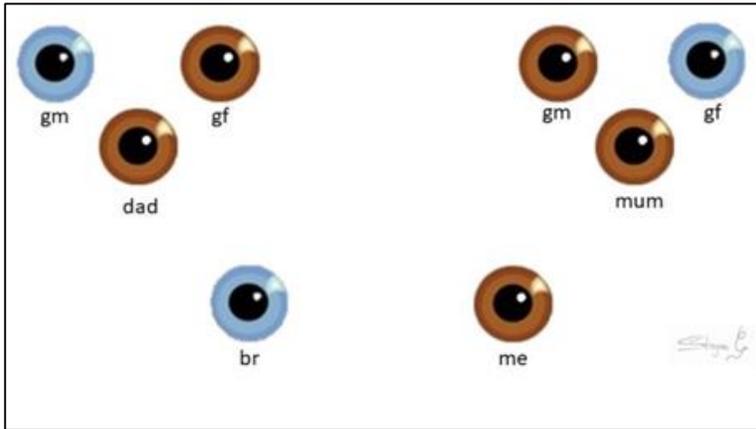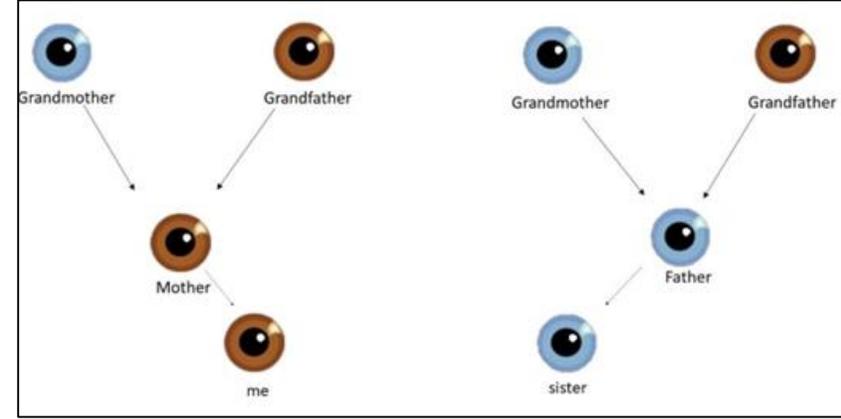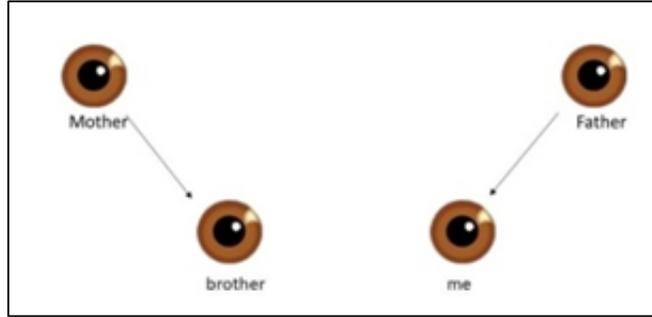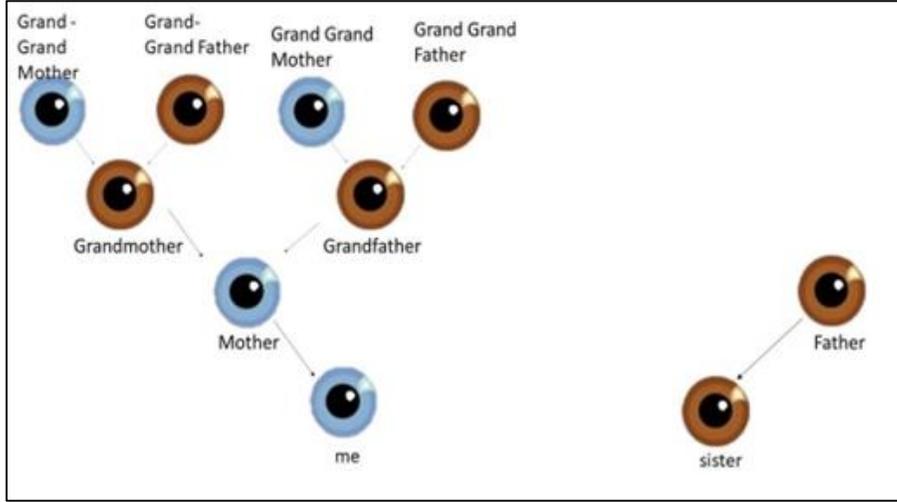
4. Results and discussion

Eye color distribution of our generation (team members and their siblings)

Color	Number of people	Color distribution, %
Brown	8	67
Blue	4	33
Green	0	0
Sum	12	100,0

Eye color distribution of all population (ancestors and team members and siblings)

Color	Number of people	Color distribution, %
Brown	27	63
Blue	15	35
Green	1	2
Sum	43	100,0

4. Results and discussion

Percentage of light eyes in Europe © Eupedia.com

| Color	Number of people	Color distribution, %
Brown	27	63
Blue	15	35
Green	1	2
Sum	43	100,0

Pirdop

20%<35%<49%

80% or more   50 -79%   20 - 49%   1 - 19%

4. Results and discussion

Eye color distribution of our generation (team members and their siblings)

Color	Number of people	Color distribution, %
Brown	8	67
Blue	4	33
Green	0	0
Sum	12	100,0

Eye color distribution of all population (ancestors) €

Color	Number of people	Color distribution, %
Brown	27	63
Blue	15	35
Green	1	2
Sum	43	100,0

Distribution for eyes color of ancestors is similar to distribution of colors for their successors. That proves genetic theory. Also if we compare the distributions we can see slightly decreasing of blue color eyes, respectively increasing of brown color eyes. This tendency is expected because of the genetically dominance of brown color gens.

5. Conclusions

1. Eyes color of successors can reveal information about eyes color of their ancestors.

2. Expected decreasing of number of recessive blue color eyes is proven in our small population.

3. The map of color distribution is correct for Pirdop area.

THANK YOU FOR YOUR ATTENTION!

Used literature

[1] https://genetics.thetech.org/ask/ask316
[2] https://www.diffen.com/difference/Dominant_vs_Recessive
[3] https://www.eupedia.com/europe/maps_of_europe.shtml?
[4] https://ghr.nlm.nih.gov/primer/traits/eyecolor

5. Conclusions

1. Eyes color of successors can reveal information about eyes color of their ancestors.

2. Expected decreasing of number of recessive blue color eyes is proven in our small population.

3. The map of color distribution is correct for Pirdop area.