

How Do Genes Determine Skin Color?

Introduction:

Skin color inheritance is a complex process influenced by multiple genes and environmental factors. Here's a simplified explanation of how it works:

Genetic Basis: Skin color is primarily determined by the amount of melanin, a pigment produced by specialized cells called melanocytes in the skin. There are two main types of melanin: eumelanin (brown/black) and pheomelanin (red/yellow). The ratio and distribution of these pigments in the skin determine its color.



Polygenic Inheritance: Skin color inheritance is polygenic, meaning it's controlled by multiple genes, each contributing to the overall phenotype (observable)

The presentation for this case is located at <http://biol.co/genskin>

Answer the questions as they are presented to you in the story of Catherine and Richard Howarth whose children are surprisingly light skinned compared to their Nigerian mother.

1. If skin color were inherited in a simple dominant or recessive pattern, like seed color in pea plants. What would be the genotypes of dark- skinned parents that could produce fair-skinned children?

2. What other traits are likely to be controlled by multiple genes?

3. What color skin would a person with AaBbCc genotype have?

4. Examine the genotypes shown, there is a pattern that explains why polygenes are called "ADDITIVE." What is the pattern?

5. What genotypes would you assign to Jonah and Sophia?

6. Create five offspring by flipping your coins and recording them on the table.

Child	Genotype	Phenotype
1		
2		
3		
4		
5		

7. What do each of the colored circles on the chart represent?

8. What genotypes and phenotypes are possible in their offspring?

9. Do you agree with this quote? Explain your reasoning using your understanding of the genetics of skin color.

10. Summarize key vocabulary:

a) Dominant and Recessive

b) Polygenic (Quantitative) Inheritance

c) Melanin

d) Genotype and Phenotype

e) Heterozygote