

Amoeba Sisters Video Recap: Pedigrees

Autosomal Recessive Pedigree

Directions: Consider a pedigree that is tracking an autosomal recessive trait, where two recessive alleles (tt) result in the inability to taste a chemical known as PTC. The ability to taste PTC is determined by the presence of a dominant allele (T). Complete the missing boxes in the chart. The first row has been done for you as an example!

*Note: The ability to taste PTC may be more complex than a simple gene trait.

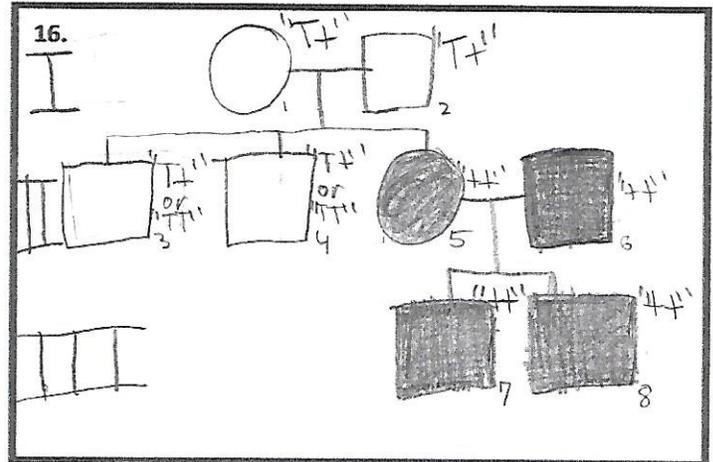
	Individual Phenotype	Shape (in Pedigree)	Shaded?
Male with genotype TT	PTC taster	Square	No
Male with genotype Tt	1. PTC taster	2. Square	3. no
Male with genotype tt	4. PTC nontaster	5. Square	6. yes
Female with genotype TT	7. PTC taster	8. circle	9. no
Female with genotype Tt	10. PTC taster	11. circle	12. no
Female with genotype tt	13. PTC nontaster	14. circle	15. yes

Design an Autosomal Recessive Pedigree!

A couple with the ability to taste PTC have two grown sons and one grown daughter. The sons have the ability to taste PTC. Their daughter is a PTC non-taster. She married a PTC non-taster man, and they have two sons.

Draw a pedigree in the box on the right that fully represents the above scenario and tracks the inability to taste PTC (non-taster), which is caused by two recessive "t" alleles. In your illustrated pedigree, please make sure that:

- ✓ (A) generations are listed as Roman numerals and the individuals are numbered.
- ✓ (B) the correct shapes for males and females are used.
- ✓ (C) the shapes that require shading are shaded.
- (D) the genotypes are listed next to each pedigree shape.



17. What is the phenotype of the sons in generation III? How do you know? "Tt" and "Tt"
because their parent are nontasters and therefore "tt" making it only possible for their children to be "Tt"

Sex-Linked Pedigrees

Sex-linked traits that are tracked in pedigrees are typically on the X chromosome. Assume the following questions refer to colorblindness, which is a sex-linked recessive trait on the X chromosome.

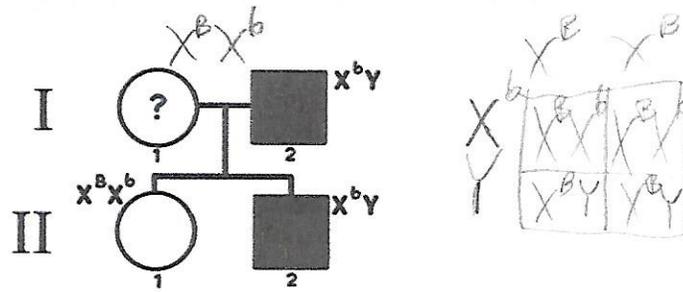
18. Circle the genotype(s) that represent(s) a female with the sex-linked recessive trait.

- $X^B X^B$ $X^B X^b$ $X^b X^b$ $X^B Y$ $X^b Y$

19. Circle the genotype(s) that represent(s) a male with the sex-linked recessive trait.

- $X^B X^B$ $X^B X^b$ $X^b X^b$ $X^B Y$ $X^b Y$





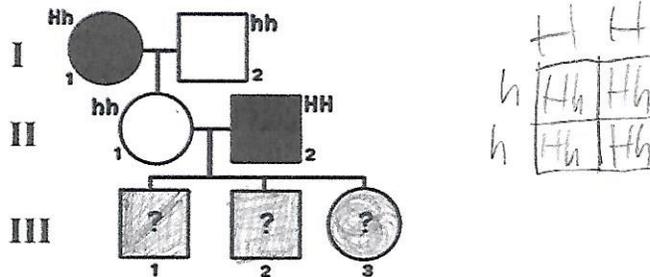
20. View the above sex-linked recessive pedigree. Can you be certain of generation I, individual #1's genotype? Why or why not? It is $X^B X^b$; if it were $X^B X^B$ they could not have a child who is $X^b Y$.

21. All males receive their X chromosome from their MOM.

22. How are sex-linked pedigrees different from autosomal pedigrees? They use X and Y.

Autosomal Dominant Pedigree

What about tracking an *autosomal dominant* trait, such as having a widow's peak? The presence of one dominant allele for this widow's peak hairline (H) will result in an individual having a widow's peak. Since this pedigree is tracking an autosomal dominant trait, shaded shapes have a widow's peak hairline. *Note: In reality, this trait may be more complex than just a simple gene.



23. How many dominant alleles does an individual need in order to have the autosomal dominant trait? 1

24. Is it possible to know the genotypes of the three children in generation III? yes
Should their shapes be shaded? yes Explain your answer to both questions.

"hh" and "Hh" can only have "Hh." The kids must inherit a "H" and therefore have a widow's peak and therefore be shaded.

