

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.

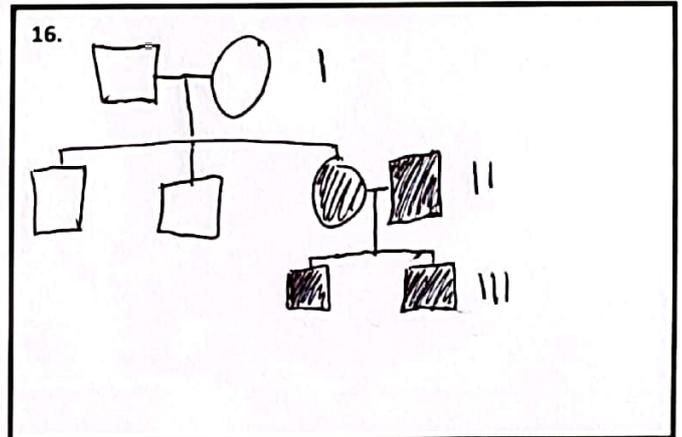
	Individual Phenotype	Shape (in Pedigree)	Shaded?
Male with genotype TT	PTC taster	Square	No
Male with genotype Tt	1. PTC taster	2. Square	3. No
Male with genotype tt	4. Non-taster	5. Square	6. Yes
Female with genotype TT	7. Taster	8. Circle	9. No
Female with genotype Tt	10. Taster	11. Circle	12. No
Female with genotype tt	13. 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. if their parents were both tt, then no other thing is possible.

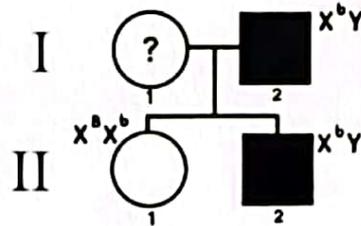
Sex-Linked Pedigrees

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.  
 $X^B X^B$     $X^B X^b$     $X^b X^b$     $X^B Y$     $X^b Y$





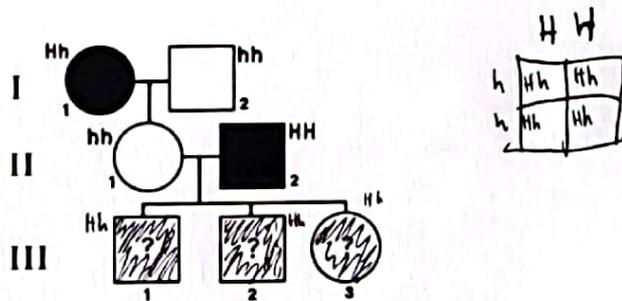
20. View the above sex-linked recessive pedigree. Can you be certain of generation I, individual #1's genotype? Why or why not? Yes, it is  $X^B X^b$  because the daughter + son wouldn't have the gene.

21. All males receive their X chromosome from their MOM

22. How are sex-linked pedigrees different from autosomal pedigrees? Some traits go only through the X chromosome

**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? not exactly yes  
Should their shapes be shaded? Yes Explain your answer to both questions.

because of the genotype of the parents, there is only one possible genotype for the parents

