

Human Genetics

A phenotype is the manifestation of a trait and can be expressed physically or biochemically. A phenotype is determined by pairs of genes, because you get one gene in the pair from your mother and one from your father. The pairs of genes represent the genotype for the trait. People can be recognized or identified by their phenotypic traits.

In this lab, you will determine some of your own phenotypic traits. From these traits, you will deduce your possible genotype(s) for these traits.

Remember the rules of dominance and recessiveness: you only need one copy of a dominant gene in order to see a dominant phenotypic trait, but you need two copies of a recessive gene in order to see a recessive phenotypic trait. Therefore, a dominant phenotypic trait might be represented by a homozygous dominant, ex. AA, or heterozygous, ex. Aa, genotype. However, a recessive phenotype will always be represented by a homozygous recessive genotype, ex. aa. Also, remember that dominant genes are represented by capital letters and recessive genes are represented by lower case letters.

Procedure:

Using the next set of characteristics, record your phenotype and possible genotype(s) in a data table in your lab notebook. Mark if you show the dominant or recessive trait.

- a. **PTC Taster (T):** Tasting PTC is a dominant trait, whereas nontasting is recessive.
- b. **Thiourea (H):** Tasting a bitter or nauseating flavor to thiourea is dominant over nontasting.
- c. **Sodium Benzoate (S):** Tasting sweet, salty, or bitter for the sodium benzoate is dominant over nontasting.
- d. **Hairline (W):** The widow's peak hairline comes to a point in the center of the forehead. Having a widow's peak hairline is dominant (genotype can be WW or Ww) to having a straight hairline (recessive, has to be ww).
- e. **Eye shape (A):** Almond-shaped eyes are dominant (A_) to round-shaped eyes (aa).
- f. **Eyelash length (E):** Long eyelashes are dominant (E) to short eyelashes (e).
- g. **Tongue-rolling (C):** The ability to roll the tongue is dominant (C) to the inability to roll the tongue (c).
- h. **Thumb (B):** The hitchhiker's thumb (thumb tip bends backward more than 30 degrees) is dominant (B) to a straight thumb (b).
- i. **Lip Thickness (L):** Thick lips are dominant (L) to thin lips (l).

Questions:

Answer these questions in complete sentences in your lab notebook

1. Which traits do you have that are dominant? (list them)
2. Which traits do you have that are recessive? (list them)
3. Which of your traits do you share with one or more of your classmates?
4. Which of your traits are unique to you?
5. What determines your traits (i.e., how do you acquire them)?
6. With knowledge of the phenotypes of a human, how can a person's genotype be determined (i.e., how did you determine your possible genotypes today – what knowledge did you use)?
7. Why was untreated paper used in the PTC taste test?