

Family Pedigree—Cleft Chin?

Overview

Students will identify family members who show the cleft chin trait and draw a family pedigree. They may be able to infer which family members carry dominant and/or recessive alleles.

Textbook References

McDougal Littell

Not addressed directly in text, but mentioned in a few places in Chapters 4 and 5.

Prentice Hall

Chapter 15, Section 1 pp. 564-570, Human Inheritance

Materials

*Materials to be supplied by the teacher or the students are marked with an asterisk.

Materials for the whole class

- 1 transparency of *Sample Pedigree*

Procedure

The cleft chin trait that was explored in **My Family's Traits** is an example of a dominant (cleft)/recessive (no cleft) gene in humans. However, it is important to note that not all carriers of the gene actually have the corresponding trait. Two possible reasons for this are:

- There may be a modifier gene that blocks the expression of the dominant allele.
- There may be environmental factors that change the expression of either allele.

It is important for teachers to be sensitive to family issues that may arise with their students. Some may not know either or both of their biological parents. Some may have step parents or step siblings. Some may be adopted. Some may not be aware that they are living with non-biological parents. However, if students understand that the cleft chin example only 'works' sometimes, then if it doesn't work in their families, there may *not* be implications of relatedness.

- Show students the *Sample Pedigree*.
- “Todd and two of his three sons (Colin and Ethan) have cleft chins, while his wife, Deb, and youngest son, Cameron, do not have cleft chins. If cleft chin is dominant (C) and no cleft chin is recessive (c), then what are possible genotypes for this family?”
- Have the students try to answer this question and write their thoughts in the science notebooks. Here is one possible line of thinking:

- Neither Deb nor Cameron has a cleft chin, so they must be homozygous recessive (cc).
- Todd has a cleft chin, so he may be either homozygous dominant (CC) or heterozygous (Cc), if we don't worry about the exceptions noted above. But which is he?
- If Todd were CC, then *all* of his children would have cleft chins. However, if Todd were Cc, then some of his children might not have cleft chins. Since Cameron doesn't have a cleft chin, Todd must be Cc. Cameron got one recessive allele from each parent.
- Since Colin and Ethan have cleft chins, they must be either CC or Cc. Since Deb can only pass on recessive genes, they must both be Cc.

Sample Pedigree



= male



= female

Shaded = cleft chin

Unshaded = No cleft chin

C =

c =

