

7 Pedigree Analysis

Pedigree Analysis allows scientists to trace the patterns of inheritance of a particular genetic characteristic over several generations.

In most human genetics studies, scientists do not know the genotypes of people involved, so possible genotypes must be inferred from pedigrees. In this lab, you will interpret a pedigree to determine genotypes and predict the genotypes of future offspring.

MATERIALS

Pedigree Datasheet

PROCESS SKILLS

- Inferring
- Calculating Probabilities

Problem

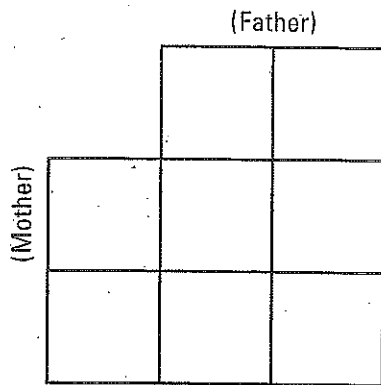
What are the genotypes of the people in the pedigree?

Procedure

- 1 Read the following background information and pedigree.
People fall into three categories for the ability to taste a bitter chemical called 6-n-propylthiouracil (PROP). People who can taste PROP find it very unpleasant. Scientists hypothesize that these people, called supertasters, are homozygous for the trait ($T_1 T_1$). People who are heterozygous ($T_1 T_2$), called medium tasters, taste PROP as being somewhat bitter. Nontasters ($T_2 T_2$) do not taste the bitterness at all.
- 2 On your datasheet, fill in the possible genotypes for each person, including the phenotypes for those people who are medium tasters.
 - First cross the Parental P₁ generation at the top of the pedigree chart.
 - Remember: Supertasters are always homozygous dominant ($T_1 T_1$). Nontasters are always homozygous recessive ($T_2 T_2$).
 - A medium taster genotype will always have one dominant T_1 gene and one recessive T_2 gene.
 - Look at the chart carefully. The siblings in each generation will help you determine the traits that are passed on to the next generation.

Analyze and Conclude

1. **Calculate** What is the probability that Jack will be a supertaster? What is the probability that Jill will be a supertaster? Explain your answers. Use the Punnett square provided to help you find the answer. Fill in the top two boxes with Jack and Jill's father's genotype; fill in the side two boxes with Jack and Jill's mother's genotype. Fill in the square will all possible genotypes for Jack and Jill.



2. **Analyze** Is the gene for being a supertaster autosomal or sex-linked? Explain your answer based on the pedigree chart.
