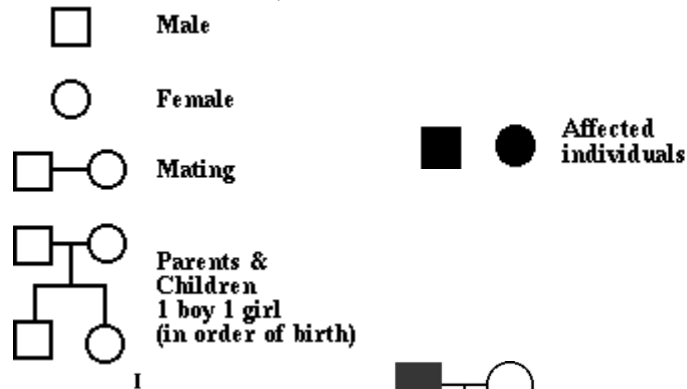


## Pedigree

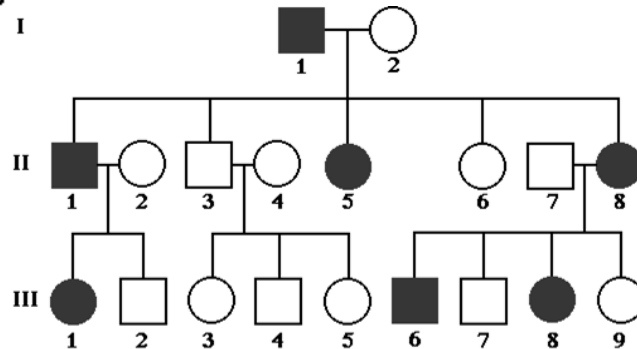
A pedigree is a chart showing an inheritance pattern (trait, disease, disorder) within a family through multiple generations. Through the use of a pedigree chart and key, the genotype and phenotype of the family members and the genetic characteristics (dominant/recessive, sex-linked) of the trait can be tracked.

An example of a pedigree key:



### Pedigree Example I:

(Family with a dominant autosomal genetic trait)

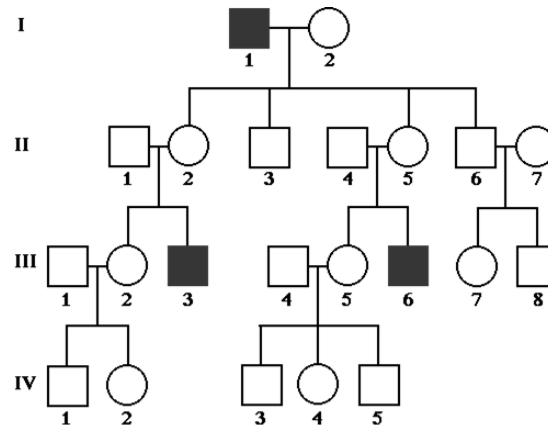


The gene for this particular genetic trait does not occur on the sex chromosomes; it occurs on an autosomal chromosome because both males and females have the trait. This information can be inferred from two facts:

- (1) Because the father has the trait, if the trait were sex-linked (on the father's X chromosome), then all females would have the trait. However, because some females do not have the trait, it is not a sex-linked trait.
  - (2) Individual III-7 who is a male did not inherit the trait from his mother, who has the trait. He received his only X chromosome from his mother.
- This particular gene is a dominant gene because
    - each of the people who have the trait has only one parent who has the trait.
    - if only one parent has the trait and the trait is not sex-linked, then the individuals who have the trait must be heterozygous for the gene.

### Pedigree Example II

(Family with a recessive sex-linked genetic trait)



The gene for this particular trait is sex-linked and recessive. This information can be inferred because only males have the trait.

- This is common in X-linked, recessive traits because females who receive the gene for the trait on the X chromosome from their fathers also receive an X chromosome from their mothers which hides the expression of the trait.
- The trait skips a generation.
  - In generation II, all of the offspring receive an X chromosome from their mother.
    - ◆ Because the males only receive the X chromosome from their mother, they do not receive the gene carrying the trait.
    - ◆ Because the females receive an X chromosome from their mother and father, they are heterozygous and do not express the recessive trait, but they are carriers.
  - In generation III, the offspring of all of the females from generation II have a 50/50 chance of passing a trait-carrying gene to their children.
    - ◆ If the males receive the trait-carrying gene, they will express the trait.
    - ◆ If the females receive the trait-carrying gene, they will again be carriers.