Pedigree Analysis

Pedigree: A family tree describing the occurrence of heritable characters in parents and offspring across as many generations as possible.
How to read a pedigree:

- **Males are represented by squares**
- **Females are represented by circles**
- An individual that **has the trait** featured in the pedigree will have the circle or square **darkened (colored in)**
- Individuals who are **carriers** for the trait (heterozygous) have their circle or square **half darkened**
- Husband and wives are connected by horizontal lines
- Offspring come off the parents by vertical lines
- Generations are numbered with Roman Numerals
- Individuals with in the generation are individually numbered

Knowing that each offspring receives one allele from each parent, a pedigree can be used to predict the genotype and phenotype of individuals.

Some Genetic Disorders

Albinism (Autosomal Recessive)

About one in every 17,000 people have Albinism. These individuals fail to produce melanin, a photoprotective pigment. While melanin's role in protecting us from ultraviolet light is understood, it also has other important functions in the development of the retina and brain and their interconnections of which we know much less.

Albinism is an autosomal recessive trait.

Cystic Fibrosis (Autosomal Recessive)

The most common lethal genetic disease in the United States is cystic fibrosis, which strikes one out of every 2500 whites of European descent but is much rarer in other groups. One out of 25 whites (4%) is a carrier. The normal allele for this gene codes for a membrane protein. If a person does not have this protein then the normal mucus that coats cells becomes thicker and stickier than normal. The mucus builds up in the pancreas, lungs, digestive tract and other organs, a condition that favors bacterial infections. Untreated, most children with cystic fibrosis die before their fifth birthday. Gentle pounding on the chest to clear mucus from clogged airways, daily doses of antibiotics to prevent infection, and other preventive treatments can prolong life. In the United States, more than half of the people with cystic fibrosis now survive into their late twenties or beyond.

Tay-Sachs Disease (Autosomal Recessive)

Tay-Sachs Disease is another lethal disorder inherited as a recessive allele. The disease is caused by a dysfunctional enzyme that fails to break down brain lipids. The symptoms of Tay-Sachs usually show up a few months after birth. The infant begins to suffer seizures, blindness and degeneration of motor and mental performance. Inevitably, the child dies within a few years.