**Genetic Sheet 5** Dihybrid crosses

A dihybrid cross involves a study of inheritance patterns for two traits. Mendel invented the dihybrid cross to determine if different traits of pea plants, such as flower color and seed shape, were inherited independently.

1. Two pea plant that are heterozygous for both seed shape and seed color. S is the allele for the dominant, spherical shape characteristic; s is the allele for the recessive, dented shape characteristic. Y is the allele for the dominant, yellow color characteristic; y is the allele for the recessive, green color characteristic. What will be the genotypic and phenotypic ratios of offspring?
2. In a dihybrid cross, SSyy x SsYy, what fraction of the offspring will be heterozygous for both traits?
3. In guinea pigs, the black hair is dominant vs. the brown hair and the short hair is dominant vs. the long hair. A guinea pig (heterozygous for both black and short hair) is crossed with a guinea pig (homozygous recessive for both traits). What is the fraction of offspring with black short hair?
4. About 70% of Americans perceive a bitter taste from the chemical phenylthiocarbamide (PTC). The ability to taste this chemical result from a dominant allele (T) and not being able to taste PTC is the result of having two recessive alleles (t). Albinism is also a single locus trait with normal pigment being dominant (A) and the lack of pigment being recessive (a). A normally pigmented woman who cannot taste PTC has a father who is an albino taster. She marries a homozygous, normally pigmented man who is a taster but who has a mother that does not taste PTC. What are the genotypes of the possible children (choose all that apply)?
5. In humans, brown eyes (B) are dominant over blue (b). A heterozygous brown-eyed man marries a blue-eyed woman. What is the probability that they have a blue-eyed boy?
6. A woman who is tongue non-roller and marries a man who is a heterozygous tongue-roller. Do they have the chance of having a tongue-roller boy? The ability to roll one’s tongue is dominant over non-rolling.
7. Cystic fibrosis (CF) is a genetic disease. This means that CF is inherited. A child will be born with CF only if two CF genes are inherited (recessive) - one from the mother and one from the father. A person who has only one CF gene is healthy and said to be a "carrier" of the disease. If the two parents are heterozygous what is the chance of having a sick girl?