

GENETICS TEST #1 STUDY GUIDE

Part I .Definitions: Define the following terms in a separate page.

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|-----------------|-------------------------|----------------|
| 1. Genetics | 7. Incomplete Dominance | |
| 2. Phenotype | 8. Codominant | 13. Allele |
| 3. Heredity | 9. Recessive | 14. Sex linked |
| 4. Heterozygous | 10. Gene | 15. Autosome |
| 5. Probability | 11. Genotype | 16. Pedigree |
| 6. Homozygous | 12. Dominant | |

Part II

1.For each genotype below, indicate whether it is heterozygous , homozygous recessive or homozygous dominant.

AA _____
Ee _____
ff _____

Part III. Inheritance Patterns: Be able to perform Punnett square and pedigree examples similar to the 5 types of inheritance patterns below. Remember that each pattern of inheritance has its own set of rules.

1) Autosomal Recessive: A woman who has the disease PKU marries a man who is healthy. The man also has a mother with PKU. What is the probability of getting:

- Homozygous dominant offspring?
- Healthy children?
- Homozygous recessive offspring?
- Heterozygous offspring?
- PKU children?

2)Autosomal Dominance: A woman suffers from familial hypercholesteremia (FH) but still has two healthy children. The husband is healthy.

- List all the genotypes.
- List all the phenotypes.

What is the probability of getting:

- c. Heterozygous children?
- d. Healthy children?
- e. PKU children?
- f. 3 children, each with PKU?

3) Codominance: Cross a heterozygous type B individual with a homozygous type A individual.

What is the probability of getting:

- a. Type O blood?
- b. Homozygous blood?
- c. Codominant blood?

4) Incomplete Dominance: Red and yellow blend to make orange. Cross a homozygous dominant red flower with a homozygous dominant yellow flower.

What is the probability of getting:

- a. Homozygous flowers?
- b. Red flowers?
- c. Orange flowers?
- d. Heterozygous flowers?

5) Sex-linked Recessive: Cross a female carrier of hemophilia with a male who has the disease. List all the phenotypes.

What is the probability of getting a:

- a. Daughter with hemophilia?
- b. Child with hemophilia?
- c. Healthy child?

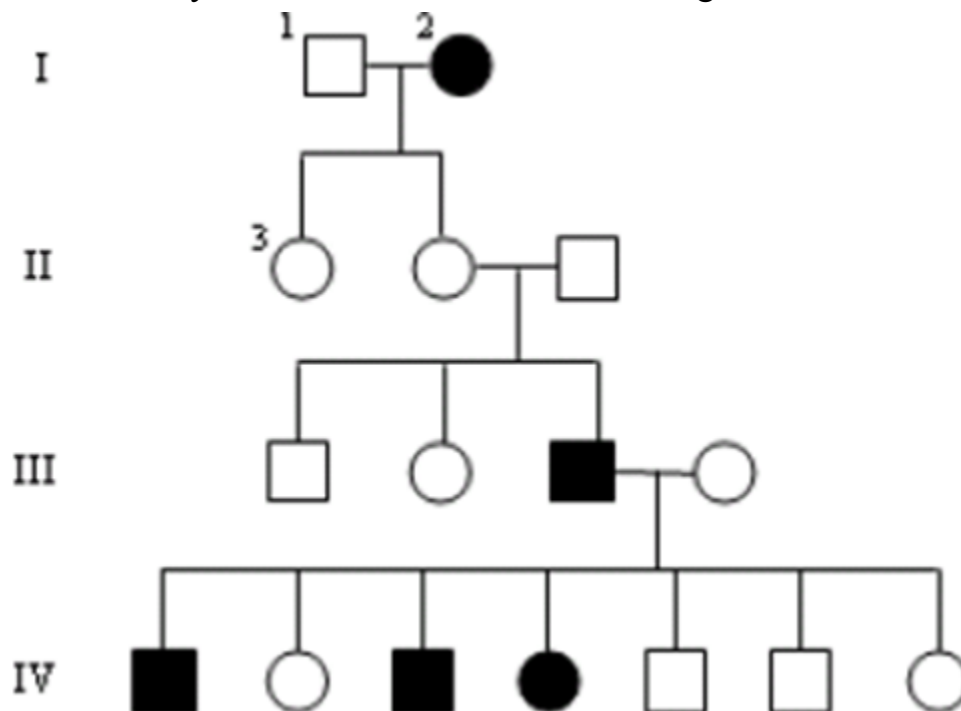
Part IV: Interpreting a Human Pedigree

Use the pedigree below to answer 1-5

1. In a pedigree, a square represents a male. If it is darkened he has hemophilia; if clear, he had normal blood clotting.

- a. How many males are there?

- b. How many males have hemophilia?
2. A circle represents a female. If it is darkened, she has hemophilia; if open she is normal.
 - a. How many females are there?
 - b. How many females have hemophilia?
3. A marriage is indicated by a horizontal line connecting a circle to a square.
 - a. How many marriages are there?
4. A line perpendicular to a marriage line indicates the offspring. If the line ends with either a circle or a square, the couple had only one child. However, if the line is connected to another horizontal line, then several children were produced, each indicated by a short vertical line connected to the horizontal line. The first child born appears to the left and the last born to the right.
 - a. How many children did the first couple (couple in row I) have?
 - b. How many children did the third couple (couple in row III) have?
5. Level I represents the first generation, level II represents the second generation.
 - a. How many generations are there?
 - b. How many members are there in the fourth generation?

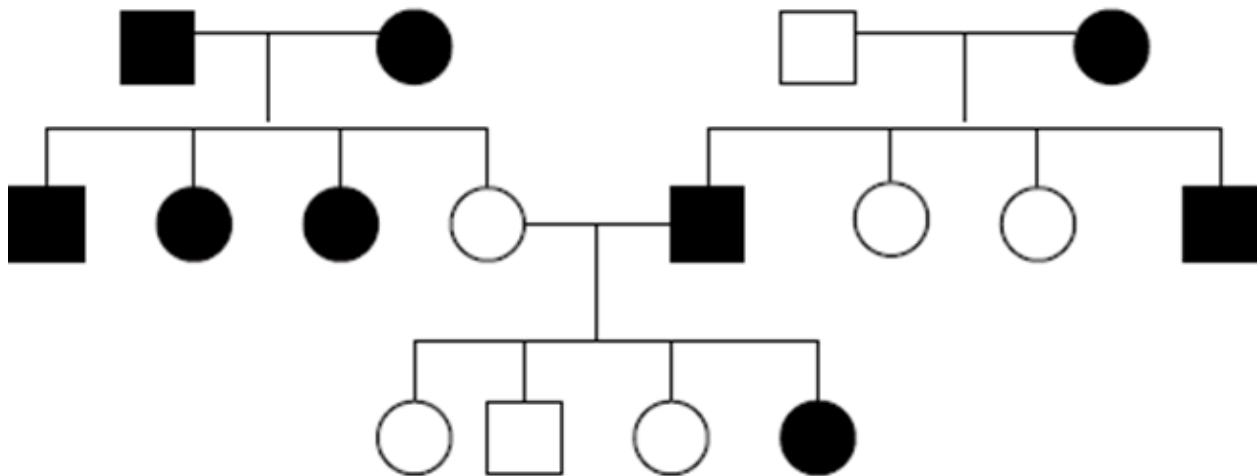


Determining Inheritance Patterns

19. When working through a pedigree, the first thing you need to do is figure out which characteristic is dominant – the shaded one or the un-shaded one. Then you need to choose a letter (let's use A) and begin assigning genotypes. Remember that recessive individuals are always homozygous, so assign their genotypes first. Then go back and look at all of the dominant individuals. For some, you will only be able to determine one allele of the genotype, so just write the one capital allele followed by a question mark (A?).

- Which characteristic is dominant? _____
- Which characteristic is recessive? _____
- Determine the genotypes of all individuals. You will have three "A?". Write your Genotypes beneath each individual.

Fur Color in Mice



○ = white female

● = black female

□ = white male

■ = black male