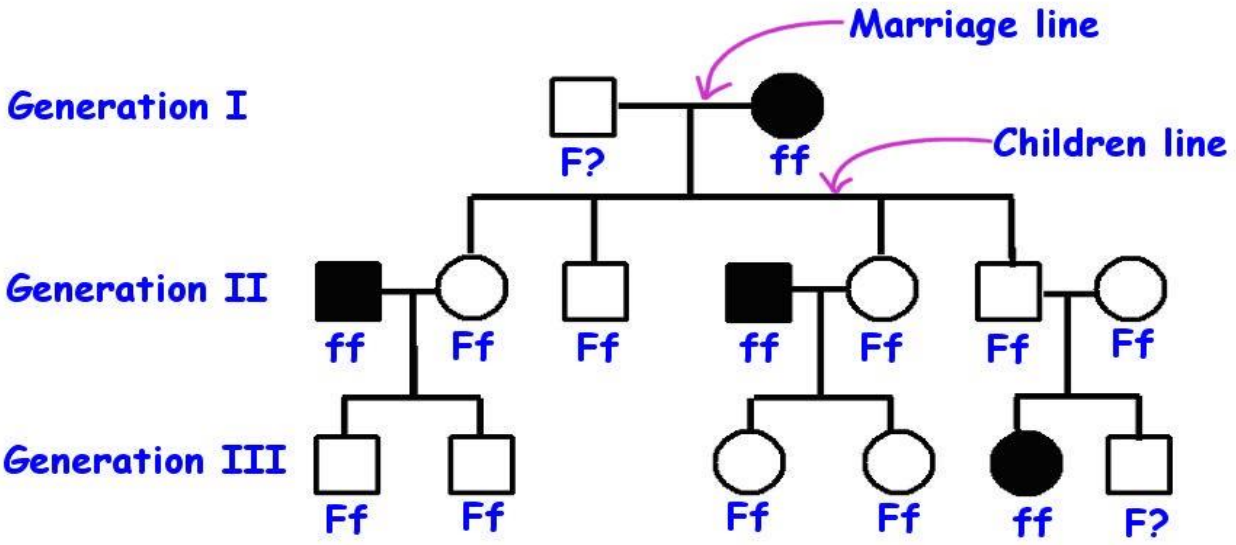
AP BIOLOGY
EVOLUTION/HEREDITY UNIT
Unit 1 Part 4C Chapter 14.4
Activity #6

NAME_____

DATE_____PERIOD____

MENDELIAN GENETICS IN HUMANS



Key:

■ =male

○ = female

■ or ● = affected

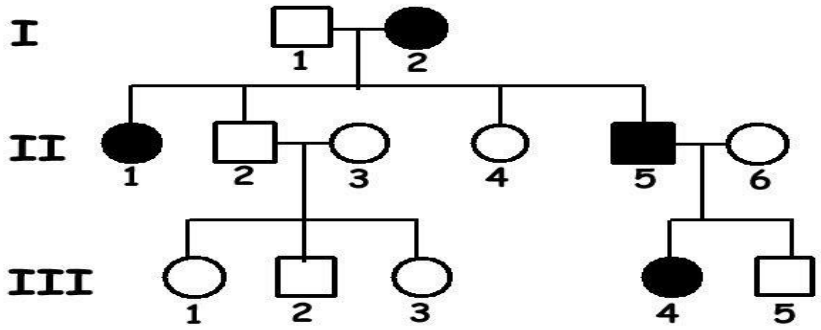
□ or ○ = normal

F = free earlobes

f = attached earlobes

QUESTIONS:

1. Use the information provided below to answer the questions that follow.



a. List the sex of the children, in order of birth, produced by the parents in Generation I.

_____

b. Is the trait being tracked in this pedigree dominant or recessive? How do you know?

_____

_____

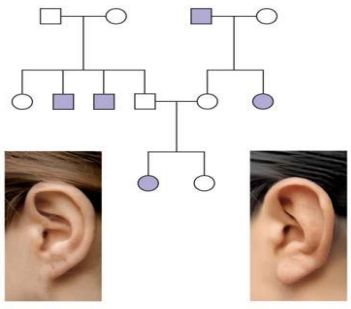
c. How many children did individuals 2 and 3 in Generation II produce?

_____

d. What is the relationship of individual 6 in Generation II to the couple in Generation I?

_____

2. Pedigree analysis is often used to determine the mode of inheritance (dominant or recessive, for example). Be sure to read the "Tips for pedigree analysis" in Figure 14.15; then complete the unlabeled pedigree by indicating the **genotypes** for all involved. What is the mode of inheritance for this pedigree?



3. Explain why you know the genotype of one female in the third generation, but are unsure of the other.

_____

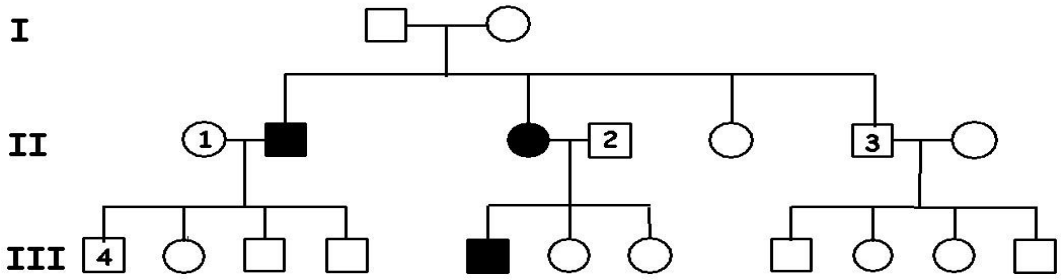
_____

4. Describe what you think is important to know medically about the behavior of recessive alleles.

_____

_____

5. Albinism (lack of skin pigmentation) is caused by a recessive allele. Consider the following human pedigree for this trait (solid symbols represent individuals who are albinos).



a. What are the genotypes of father and mother in Generation I?

Father:_____ Mother:_____

b. In Generation II, what is the genotype of:

Mate 1_____ Mate 2:_____

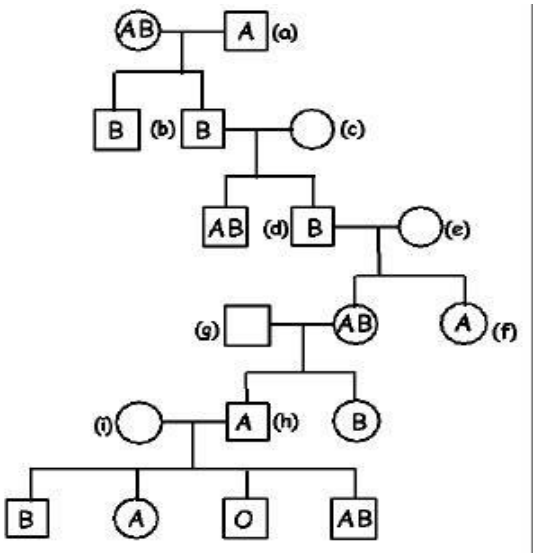
c. In Generation III, what is the genotype of son 4?_____

d. Can you predict the genotype of son 3? Explain.

_____

_____

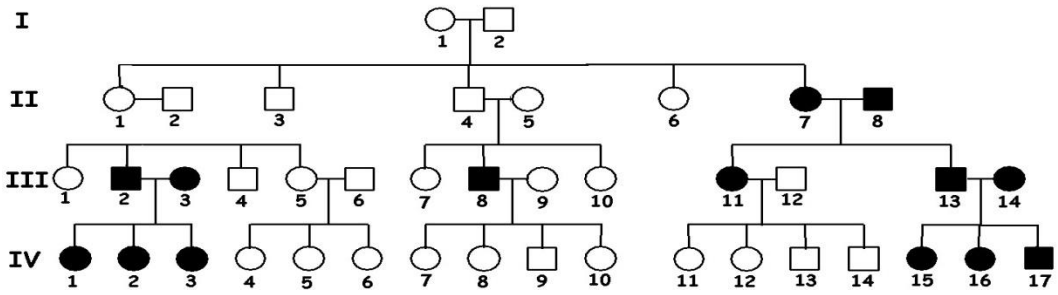
6. The pedigree below shows the ABO blood group for a family.



What is the genotype for the following individuals?

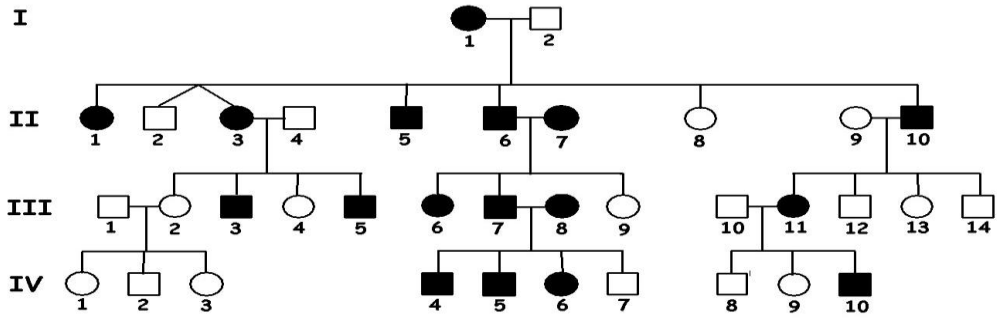
Individual	Genotype	Individual	Genotype
(a)		(f)	
(b)		(g)	
(c)		(h)	
(d)		(i)	
(e)			

7. The following pedigree traces a form of deafness in a family. This deafness is a recessive trait. Using the letters N for normal and n for deafness, provide the genotypes for the individual indicated in the chart that follows.



Individual	Genotype	Individual	Genotype
I 1		III 5	
II 2		III 9	
II 6		IV 4	
II 7		IV 12	

8. The pedigree below traces brachydactyly, a condition in which fingers are abnormally short, through several generations of a family. Those individuals afflicted with brachydactyly are shaded. Use this pedigree to answer the questions that follow.



a. Examine the children produced by individuals 6 & 7 in Generation II. How do you explain the fact that 9 is not brachydactyly?

_____

_____

b. Is brachydactyly a dominant or recessive disorder?_____

c. What is the relationship between individuals 2 & 3 in Generation II?

_____

9. Identify the inherited disorder described below.

   a. Recessively inherited disorder in which a defective protein causes the buildup of chloride ions in cells, the osmotic uptake of water from the surrounding mucus, and results in very thick, viscous mucus. This thick mucus accumulates in the pancreas, lungs, & digestive tract.

      Disorder:_____

   b. Recessively inherited disorder where a missing enzyme results in the accumulation of lipids in the brain. The accumulation of lipids in the brain causes seizures, blindness, and degeneration of motor & mental performance.

Disorder:_____

c. Recessively inherited disorder that results in a single amino acid substitution in hemoglobin. This substitution results in abnormally shaped hemoglobin molecules and as a result abnormally shaped red blood cells.

Disorder:_____

d. This disorder is caused by a late-acting lethal dominant allele. The phenotype does not appear until 35 to 40 years of age and causes degeneration of the nervous system and eventually death.

Disorder:_____

10. Explain how a lethal recessive gene can be maintained in a population.

_____

_____

End of Chapter Synthesis and Evaluation Problems

1. Answer the following question(s): Imagine that one of your parents has Huntington's disease. What is the probability that you will also someday manifest the disease? There is no cure for Huntington's. Would you want to be tested for the Huntington's allele? Why or why not?

_____

_____

_____

_____

_____

Study Guide/ISN (20 points)

In your study guide book, review pages 109 to 110. In your ISN, go back to the following: **Chapter 14 Mendel and the Gene Idea Must Know!** In one color, copy down the <u>fourth and fifth</u> must know items listed on page 105 in study guide leaving space underneath to include in an different color a brief description, diagram, model, or pneumonic device that will help you study for the unit test and more importantly the AP Test in May.

Podcasts/ AP Biology/ISN (See Syllabus for format) **(20 points each)**

1. Peas in a pod-Cracking the Code (Big Idea 3)