

Genetics Review A: (Quiz 1 Study Guide)

1. A male is born with a straight hairline, which is a recessive phenotype to the dominant widow's peak. Which of the following genotypes could his parents have?
 - a. HH and HH
 - b. Hh and Hh
 - c. Hh and HH
 - d. HH and hh

2. In peas, the allele for round pea (R) is dominant to the allele for wrinkled pea (r). If a heterozygous plant (Rr) is crossed with another heterozygous plant (Rr), what genotype will likely be the most common among the offspring?
 - a. RR
 - b. Rr
 - c. rr
 - d. ALL genotypes will be equally common

3. Hitchhiker thumb is caused by a **Dominant** allele (H). If MOM is heterozygous and all the children have hitchhiker's thumbs, what is DAD's genotype?
 - a. HH
 - b. Hh
 - c. hh
 - d. none are correct choices

4. A male dragonfly homozygous dominant for green body color is mated with a female homozygous for the recessive blue color. If they had 12 baby dragonflies, there would probably be _____ ?
 - a. 12 blue babies
 - b. 9 blue and 3 green babies
 - c. 9 green and 3 blue babies
 - d. 12 green babies

A female brown horse with the genotype Bb is mated with a male white horse with a bb genotype. Complete the Punnett Square below and then answer questions 5- 8.

5. What is the chance for a brown horse? _____

6. If 4 horses are born from these parents, how many does the Punnett square predict will be white? _____

7. If 4 horses are born from these parents, how many does the Punnett square predict will be homozygous? _____

8. The owner of the female brown horse (Bb) would like only brown horses. What genotype will a male horse need to have to produce only horses with brown fur?
 - a. bb
 - b. Bb
 - c. BB
 - d. It is impossible to produce only brown horses

In guinea pigs, short hair (H) is dominant to long hair (h). A male guinea pig with long hair is crossed with a female guinea pig with short hair. Her mother had long hair. Complete the Punnett square below for this cross and answer the questions.

9. What is the probability for having each of the following genotypes?

- HH: _____
- Hh: _____
- hh: _____

10. What is the probability for having each of the following phenotypes?

- Short hair: _____
- Long hair: _____

11. Only mutations in _____ cells can be inherited by the next generation?
- skin
 - brain
 - ovary
 - muscle
12. HD is caused by a Dominant mutation to a gene for producing an important brain protein. If MOM is heterozygous for HD and the children all have a 75% chance of inheriting the disease, what is DAD's genotype?
- HH
 - Hh
 - hh
 - none are correct choices
13. PKU disease in humans is caused by a **recessive** mutation. What is the chance of a child inheriting PKU disease if mom has PKU disease and dad is homozygous for healthy?
- 0%
 - 25%
 - 50%
 - 75%

Freckles is a **Dominant** (F) human trait and NO Freckles is recessive (f). If MOM is heterozygous for freckles and DAD is heterozygous for freckles → answer questions #14-16.

14. What is MOM's genotype?
- FF
 - Ff
 - ff
 - freckles
 - no freckles
15. What is DAD's **phenotype**?
- FF
 - Ff
 - ff
 - freckles
 - no freckles
16. What is the chance that this couple will have a child with NO Freckles?
- 0%
 - 25%
 - 50%
 - 75%

17. XP is caused by a **Recessive** mutation to a gene for producing a repair enzyme protein. If MOM is a heterozygous carrier for XP, identify which chance for children inheriting XP listed below is NOT possible if DAD has a healthy phenotype but his genotype is unknown?
- 0%
 - 25%
 - 50%
 - 75%
 - both c and d are impossible
 - both a and b are impossible
 - ALL choices are possible
 - All choices are s impossible

18. A female bumblebee with recessive **orange** stripes mates with a male heterozygous for **yellow** stripes. In a group of 10 offspring, which result below is the most likely to occur?
- 10 bumblebees with yellow stripes
 - 6 bumblebees with yellow stripes and 4 with orange stripes
 - 5 bumblebees with yellow stripes and 5 with orange stripes
 - 2 bumblebees with yellow stripes and 8 with orange stripes
 - 10 bumblebees with orange stripes
 - None of the choices above are correct
19. A female bumblebee with recessive **orange** stripes mates with a male heterozygous for **yellow** stripes. In a group of 10 offspring, which of the following results would be impossible?
- 10 bumblebees with yellow stripes
 - 6 bumblebees with yellow stripes and 4 with orange stripes
 - 5 bumblebees with yellow stripes and 5 with orange stripes
 - 2 bumblebees with yellow stripes and 8 with orange stripes
 - 10 bumblebees with orange stripes
 - All choices above are possible
 - All choices above are impossible