**Genetics Study Guide**

1. A female that is planning to become pregnant is concerned about her exposure to environmental mutagens which may have caused DNA mutations. In order for these mutations to become heritable, what types of cells must they affect? Why?

Sex cells; Egg cell or ovum

Only DNA (chromosomes) from the egg cell will make up the baby’s DNA

Any mutations in other cells (such as hair cells, skin cells, etc.) would not be passed to the baby at all!

1. List 5 examples of inherited traits and 5 examples of acquired traits

Inherited traits: must be passed from parent to offspring through DNA; cannot be changed

Acquired traits: learned behaviors; not found in DNA; can be changed

1. How many chromosomes do regular (somatic) cells contain? How many chromosomes are found in sex cells (sperm and egg/ovum)? Why do sex cells have this number of chromosomes?

46 chromosomes in somatic cells (non sex cells)

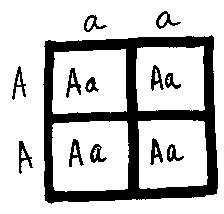
23 chromosomes in sex cells (sperm and egg)

In order to maintain the proper number of chromosomes in the baby (23 chromosomes from mom’s egg cell + 23 chromosomes from dad’s sperm cell = 46 total for the baby)

1. In fruit flies, straight wing is dominant over curly wing. What are the possible offspring of a homozygous or purebred straight winged fly and a curly winged fly?

A = straight a = curly

Parent 1 = AA Parent 2 = aa

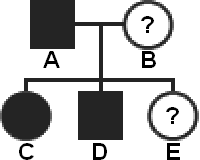


All Aa which will be straight winged because straight is dominant

1. Blood types in humans are an example of traits controlled by \_\_\_\_\_\_\_\_
   1. Pedigree
   2. Multiple alleles
   3. Offspring
   4. Only homozygous parents
2. \_\_\_\_\_\_\_\_\_\_\_\_\_ is one type of genetic engineering, where a normal allele is placed into a virus.
   1. A color blind test
   2. Down’s Syndrome
   3. Gene therapy
   4. Polygenic inheritance

Assuming a recessive inheritance pattern, if individual “E” married an individual who is homozygous recessive, what is the probability that their first child will be homozygous recessive?

1. 1/8
2. ¼
3. ½
4. 1



Individuals A, C, and D must have the genotype aa because they are showing the recessive trait (shaded)

Individual B must be Aa because she is not affected (at least 1 capital A) but has children that are affected (must be a carrier)

Individual E is not affected, so must have inherited a A from individual B and a lowercase a from individual A

If individual E (Aa) had children with a homozygous recessive individual (aa) ½ of their offspring would be homozygous recessive (aa)

Aa x aa gives two Aa and two aa

1. Albinism (lack of melanin that gives the skin color) in humans is caused by a recessive allele. A normal couple has 4 children; 1 of the children is albino.

a = albinism A = normal

What are the only possible genotypes of the **parents**? \_\_\_\_\_\_\_\_\_\_\_ X \_\_\_\_\_\_\_\_\_\_\_\_

Parent 1 and Parent 2 must each have at least 1 A (because they appear normal)

One child has albinism, so their parents have to each at least carry the allele for albinism

This makes the parents genotypes both Aa