Chapter 15: Human Genetics 101

Name:

1. Hemophilia is a sex linked recessive disorder defined by the absence of one or more of the proteins required for blood clotting. Which of the following statements are true?
   1. For a male to express hemophilia he needs just one infected Y chromosome carrying the gene.
   2. All females will show signs of hemophilia if they have an infected mother
   3. All males from fathers who have the disease will express it
   4. Only (and all) homozygous females will express the disease
   5. Homozygous males will show the disease
2. Which of the following best defines a Barr body?
   1. Genes on the X chromosomes that are condensed and act collectively
   2. Genes that selectively activated
   3. An inactive X cell
   4. An inactive X chromosome
   5. All of the above
3. Why are women who are born with an extra X chromosome (XXX) healthy and phenotypically indistinguishable from normal XX women?
   1. Inactivation of two X chromosomes in XXX women would leave them with one genetically active X, as in women with the normal number of chromosomes.
   2. Only one X chromosome is used in a woman at any given time, and the others are just spectator genes. Hence women with XXX chromosomes are no different from XX women
   3. Question is incorrect; women with XXX chromosomes are distinguishable and phenotypically different from XX women.
   4. Women with XXX chromosomes have only 1 Barr body, and thus microscopically revealing XX active chromosomes, making them equal with XX women.
   5. More than two above are correct.
4. Determine the sequence of genes along a chromosome based on the following recombination frequencies: A-B, 8 map unite; A-C, 28 map units; A-D, 25 map units; B-C, 20 map units; B-D, 33 map units.
   1. D-B-C-A
   2. A-D-B-C
   3. D-A-B-C
   4. A-B-C-D
   5. C-A-B-D

**Questions 5-**

A wild type fruit fly (heterozygous for gray body color and normal wings) is mated with a black fly with vestigial wings. The offspring have the following phenotypic distribution: Wild type, 778; black-vestigial, 785; black-normal, 158; gray-vestigial, 162.

1. What is the recombination frequency between these genes for body color and wing size?
   1. 8%
   2. 17%
   3. 9%
   4. 42%
   5. 41%
2. Which of the following is true about these genes?
   1. They are linked, meaning they are on different chromosomes and inherited together
   2. They are linked, meaning they are on the same sister chromosomes and inherited together
   3. They are linked, meaning they are on the same homologous chromosome and inherited separately
   4. They are linked, meaning they are on the same chromosome and tend to be inherited together.
   5. They are unlinked, meaning they are on different chromosomes and inherited separately.
3. What is the distance between these genes on a chromosome?
   1. 8 CM
   2. 17 CM
   3. 9 CM
   4. 42 CM
   5. 41 CM
4. What kind of frequency of recombination would one observed from a testcross of any two genes located on different chromosomes? Linked or Unlinked?
   1. 8%, linked
   2. 17%, unlinked
   3. 42%, linked
   4. 50%, linked
   5. 50%, unlinked