Sex-Linked Inheritance

Usually, sex-linked disorders are recessive disorders found on the X chromosome. Because women have two X chromosomes, they need to inherit two bad X chromosomes to become infected with the disease. This is not likely to happen so women with sex-linked disorders are very rare. Men however only have one single X chromosome. Therefore if a male has the damaged gene on his only X chromosome he will have the disorder because he does not have a “backup” X chromosome. A male’s Y chromosome does not offset any damage done to the X chromosome. Examples of Sex-Linked disorders are hemophilia, colorblindness, and muscular dystrophy.

BE SURE TO USE A PENCIL...NO PENS!

1. Two normal-visioned parents produce a colorblind son. Draw a pedigree that includes every person (3 people) mentioned in the story. Include a Punnett square of the parents.

   - Draw your Punnett square below
   - Draw your pedigree below

   a. What are the genotypes of the parents?
      - Mom = ________________
      - Dad = ________________

   b. What are the chances of their next child being a colorblind daughter? ____________

   c. Before having this first child, what was the probability this couple would have three children, all healthy?

BE SURE TO USE A PENCIL. NO PENS!

2. In humans, the gene for normal blood clotting (X<sup>H</sup>) is dominant to the gene for hemophilia (X<sup>h</sup>). This is a sex-linked trait found on the X chromosome. A woman with normal blood clotting has four children. They are a normal son, a hemophilic son, and two normal daughters. The father has normal blood clotting. Draw a pedigree that includes every person mentioned in the story.

   - Draw a Punnett square for the mother and father.
   - Draw pedigree below that shows all 6 people of this family

   a. Write in the probable genotype next to or inside of each circle and square in your pedigree above.

   b. If they decide to have another child, what are the chances the child will be a girl who carries the disorder?
      - 0%
      - 25%
      - 50%
      - 75%
      - 100%
3. A man, whose mother is homozygous dominant and whose father is a hemophiliac, marries a woman with no history of hemophilia in her family. The man and woman decide to raise a family and have 3 children, a boy, a girl, and another boy. Draw a pedigree that includes every person mentioned in the story. Include a Punnett square of the man and woman.

BE SURE TO USE A PENCIL. NO PENS!

Draw the Punnett Square below showing the man and woman

Draw pedigree below that shows all 7 people in this family

a. Write in the probable genotype next to or inside of each circle and square in your pedigree above.

b. What are the chances that the man and woman can have a child with hemophilia?

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>