Quick Lab Sex Linked Traits: Hemophilia

The relationship between genotype and phenotype in sex linked genes differs from that of autosomal recessive genes. A female must have two recessive alleles of a sex-linked gene to express a recessive sex linked trait. Just one recessive allele is needed for the same gene to be expressed in a male. In this lab you will model the inheritance pattern of sex linked genes.

Problem: How does probability explain sex linked inheritance?

Procedure:

1. We will be looking at the sex linked recessive trait of hemophilia. In this cross: The mother is a carrier for Hemophilia and the father does not have Hemophilia. Therefore the mother has one normal dominant gene and one abnormal recessive gene for hemophilia. The father has one normal gene and one Y

X HXh Mother X HY Father

One coin will represent the oovum. Put the two possible contributions of the mother on the coin, one on each side.

The other coin will represent the sperm. Put the two possible contributions of the father on the coin, one on each side.

1. Flip the two coins and record the genotype of the “offspring”
2. Repeat step 2 until you have modeled 25 genetic crosses. Make a data table to record each genetic cross you model.
3. Calculate the genotype and phenotype probabilities for both male and females. Calculate the frequency of male offspring and female offspring

Analyze and Conclude:

1. Do all of the females from the genetic cross show the recessive trait? Do all of the males show the recessive trait? Why or why not?
2. Make a punnett square that shows the genetic cross.
3. Do the results from your punnet square agree with those from your experiment? Why or Why not?