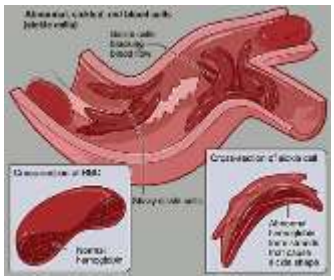
Anatomy/Physiology Name _____

Anatomy & Physiology - Genetics of Blood Disorders

Introduction: Hemophilia and Sickle Cell Anemia

Hemophilia applies to several different hereditary bleeding disorders that result from a lack of any of the factors needed for clotting. Commonly called "bleeder's disease," even minor tissue trauma results in proonged bleeding and can be life threatening. Repeated bleeding into joints causes them to become disabled and painful. Hemophilia is a sex linked train so the affected gene is found on the X chromosome. This gene causes missing or low level of blood clotting factors which will lead to excessive bleeding. The normal condition is represented by the capital letter "H," while the defective gene is represented by the lower case letter "h."



Sickle Cell Anemia is a homozygous recessive trait (not sex linked) that causes the blood cells to take on the shape of a sickle rather that a round shape. These sickle shaped cells rupture easily leaving the victim gasping for air and in intense pain – death can result.

SHOW ALL WORK! Use Punnet Squares

1. If a female is a carrier for hemophilia $X^{H}X^{h}$ and is married to a man with hemophilia $X^{h}Y$, what is the probability that she will have a daughter with hemophilia?

2. A normal female marries a man who has hemophilia. (You'll need to figure out the genotypes). What percentage of their sons will have hemophilia?

3. If a female has hemophilia and is married to a normal man.....

What percentage of her sons will have hemophilia?

What percentage of her daughters will have hemophilia?

4. A woman with sickle cell anemia is married to a man who is a carrier for the trait.

(a a x A a). What is the chance of their children having sickle cell anemia?

5. What is the chance that two people (both being carriers for sickle cell anemia) will have a child with the disease?

6, What is the chance that a female who is a carrier for sickle cell anemia will have a child with sickle cell anemia if she marries a normal man?

7. Von Willebrand Disease is an autosomal dominant disorder (not located on the sex chromosomes) where blood will not clot properly.

What would be the two possible genotypes of a person who has the disorder?

If a person is heterozygous for the trait (having the disease) is married to a normal spouse (dd), what is the chance that their children will have the disorder.