Cosmo School

Work Sheet: 04

Biology (Chapter-12: Heredity in Organisms and Evolution)

Class: X

Name of the student: .....*Date:* ...../...../.....

❖ **Genetic Disorder:**

Inheriting a specific disease, condition, or trait depends on the type of chromosome that is affected. The two types are autosomal chromosomes and sex chromosomes. It also depends on whether the trait is dominant or recessive.

1) Sex linked disorder:

- Sex linked genes are genes that are in the sex chromosomes and that are therefore inherited differently between males and females.
- In most cases, sex-linked disorders occur due to the mutation of the X chromosome.
- In female, there are two X chromosomes. If one X chromosome is affected by mutation, symptoms of genetic disorders are never expressed as the other X chromosome remains normal.

Q. Why are sex-linked disorder hereditary diseases?

.....

.....

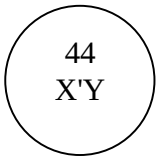
.....

.....

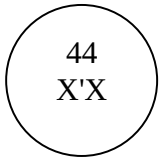
Color blindness:

- Color blindness is one kind of sex-linked disorder.
- Color blindness, also known as color vision deficiency, is the decreased ability to see color or differences in color.
- Color blindness is a condition when someone cannot properly identify any color.
- To identify color, we have pigments in our optical nerve cells.
- If someone lacks a single pigment, then he would not be able to differentiate color red and green. It is the universal problem of color blindness.
- For lacking of more than one pigment besides red and green, the patient cannot differentiate the color blue and yellow.

❖ Write down the answer of the following questions on the basis of the following information.



Father



Mother

Here,

X indicates normal chromosome

X′ indicates color blind expressing mutant chromosome

Q. Who is the carrier of sex-linked disorder?

.....

Q. What will be the ratio of color blind male baby, color blind female baby, carrier female baby and normal baby?

.....

.....

.....

.....

.....

2) <u>Autosomal disorder:</u>

- An autosomal recessive disorder means two copies of an abnormal gene must be present in order for the disease or trait to develop.
- A mutation in a gene on one of the first 22 non-sex chromosomes can lead to an autosomal disorder.
- Genes come in pairs. One gene in each pair comes from the mother, and the other gene comes from the father.
- Recessive inheritance means both genes in a pair must be abnormal to cause disease. People with only one defective gene in the pair are called carriers. These people are most often not affected with the condition. However, they can pass the abnormal gene to their children.

Thalassemia:

- Thalassemia is an autosomal recessive disorder i.e. when both father and mother are the carriers or both are the patient of thalassemia, only then it dominates in offspring.
- Thalassemia is the abnormal state of red blood cells. Because of this disease, red blood cells are disintegrated.
- This disease genetically passes from generation to generation.
- Red blood cell contains two types of protein $\propto$ globulin and β globulin. Thalassemia is caused for the disintegration of the two genes related to the above mentioned proteins.

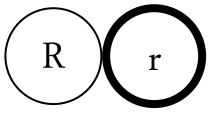
Q. Why is the marriage risk in between two maternal or paternal cousins or two blood related relatives.

.....

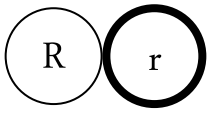
.....

.....

❖ Write down the answer of the following question on the basis of the following information.



Male



Female

Here,
R indicates healthy gene
r indicates thalassemia gene

Q. What will be the ratio of thalassemia affected baby, healthy but thalassemia carrier baby and healthy baby?

.....

.....

.....