1. What is genetics?

Genetics is the science of heredity. It includes the study of what genes are, how they carry information, how they are replicated. It includes how genes are passed to subsequent generations of cells or passed between organisms, and how the expression of their information within an organism determines the particular characteristics of that organism.

2. Who did coin the term genetics?

William Bateson coined the term Genetics in 1909.

3. Who regarded as the father of Genetics?

Gregor Johann Mendel (1822-1884) is regarded as father of genetics.

4.What is heredity?

The transmission of characters from parents to offspring is known as heredity.

5.Who coined the term gene?

W. Johannsen coined the term gene in 1909.

6.Name the rediscoverer of menellian genetics?

Hugo De Vries,Karl Correns independently rediscover mendellism.

7.What is phenotype?

The characters of an individual shows externally or in physical appearance are known as phenotypic characters or phenotypes.

8.What is genotype?

The genetic constituent of a phenotypic appearance is known as genotype of an individual.

9.What are allele or allelomorf ?

Allele is a Greek word which means belonging to one another. It refers to one of the two members of a gene pair. These represent alternatives of a character and are present on two separate chromosomes of a homologous pair, but at the corresponding loci(locus:plural form).For example in a gene pair Tt, T is present on one chromosome and t in the other homologue. So allele or allelomorphs are a pair of genes representing the two alternatives of the same character and located at the same locus in the homologous chromosomes.

10.What do you mean by homozygous and heterozygous?

Every organism possesses two genes for every character.If in an organism the two genes for every character.If in an organism the two genes for a particular character are identical,it is said to pure or homozygous for that character.The prefix 'homo'means the same and 'zygo'means a pair.For example tall plants with TT or dwarf plants tt are homozygous.They produce only one type of gamets.

Heterozygous organism possesses contrasting genes of a pair.If recessives two different alleles for the same character from its two parents.The prefix 'hetero'means different and 'zygo'means a pair.So,an organism with it will be heterozygous.These produce two different types of gemets.

11.What do you mean by back cross and test cross?

Crosses between F1 offspring with either of the two parents are known as back cross.

The test cross is the cross between heterozygous F1 hybrid and the double recessive homozygous parent.

12.What is reciprocal cross?

The reciprocal crosses involves two crosses concerning the same characteristics, but with reversed sexes. It means if in first cross 'A' is a female parent and 'B' is the male parent and in the second or reciprocal cross 'A' will be used as male parent and 'B' as female parent.

13.What is meant by factor hypothesis or interaction of genes?

Usually a single gene control one character and the alleles of a pair are related as dominant and recessive. But, various exception have been noticed to these facts.In some cases more than one pair of genes may influence the same characters.These may interact in different ways by adding,substracting or modifying the character or may inhibit the effect of another pair of genes.These concept was introduced by Bateson and is known as Bateson factor hypothesis.

14.State Mendel's 1st law of inheritance.

The paternal and maternal alleles of a gene,which come close together in the F1 hybrid,donot mix themselves rather they separate from each other during the formation of gametes in the F1 hybrid to be distributed in F2 offspring in a particular phenotypic (3:1)and genotypic (1:2:1) ratios. This separation of alleles from one another is known as law of segregation or Mendel's 1st law of inheritance.

15.State Mendel's 2nd law of inheritance.

Mendel's 2nd law of inheritance i.e. law of independent assortment states that the alleles at different genes assort independently of each other, resulting in a 9:3:3:1 phenotypic ratio in F2 progeny from a dihybrid cross(the number of genes is two and the number of alleles is four).

16.State Mendel's first postulate(unit factors in pairs).

Unit factors in pairs state that genetic characters are controlled by unit factors that exist in pairs in individual organism (after Klug and Cummings,2000).

17.What is Mendel's 2nd postulate(dominance/recessive)?

When two unlike unit factors responsible for a single character are present in a single individual,one unit factor is dominant to other,which is said to be recessive(after Klug and Cummings,2000).This is regarded as Mendel's 2nd postulate(dominance/recessive).

18.What is blending inheritance?

Blending inheritance stated that the characters of an individual were formed as a result of the blending of essences from its parents.At present,this early theory of heredity becomes discarded.

19.What is monohybrid cross?

A genetic cross between two individuals involving only one character,the cross is called monohybrid cross.eg.TT x tt.

20.What is dihybrid cross?

The cross between two individuals involving two characters is known as dihybrid cross. E.g. Seed coat colour and seed coat surface-

Yellow,round X green,wrinkled

GGWW X ggww

21.What is heterozygous?

Heterozygous refers to the presence of both alleles of a diallelic gene.e.g.Tt gene that control the height character.

22.What is homozygous?

Homozygous is a state or condition that indicates the presence of two identical alleles of a diallelic gene.e.g. TT or tt genes that controls the character of height.

23.What is dominance?

Dominance refers to the condition in which one member of an allelic pair is manifested to the exclusion of the other.Dominant allele can express itself both in heterozygous as well as in homozygous condition.

24.What is recessive?

The term recessive describe the allele which is not expressed in heterozygous condition but can express its character only in homozygous condition.

25.What is phenotype?

The character that appear externally is known as phenotypic character of the individual. As for example tall and dwarf character of a pea plant (height character).

26.What is genotype?

The allelic constitution of a character apart from its external features is known as genotype. Tt (tall),TT (tall),tt (dwarf) are the three different allelic constitution of height character of pea plant.

27.What percentage of F2 offspring in a monohybrid cross experiment will be true breeding?

Fifty percent of the total offspring of F2 generation in a monohybrid cross experiment will be true breeding and they will be of 25% pure dominant character as well as 25% pure recessive character.

28.What percentage of F2 offspring in a monohybrid cross experiment will be heterozygous?

Fifty percentage of F2 offspring in a monohybrid cross experiment will be heterozygous.

STUDY MATERIAL COMPILED AND CIRCULATED BY

ARPITA CHAKRABORTY,

STATE AIDED COLLEGE TEACHER,

DEPARTMENT OF BOTANY,

NARAJOLE RAJ COLLEGE.

TOPIC-BASIC CONCEPTS IN MENDELLIAN GENETICS.