

Solved by Muzammil Hussain

1. Write note and Leading, Lagging Strand, Okazaki fragment, Gyrase?

Leading strand and Lagging strand: One strand of DNA is called as leading strand while other strand is called as lagging strand. Continuous replication in leading strand. Discontinuous replication in lagging strands.

Gyrases: Double helical structure is opened by enzyme gyrase. These enzymes remove helix and produce a nick to uncoiled DNA.

Okazaki fragments: forms of small fragments which are called as Okazaki fragments.

2. Particulate and Blending inheritance?

The **particulate** hypothesis was offered by Gregor Mendel who discovered that traits are **inherited** in discrete units that we now know as genes. Instead of **blending**, the offspring inherits a version of a gene, called an allele, from each of the parents. Only one allele is expressed depending on a number of factors.

3. Polytene with example?

Giant chromosome Found in salivary glands of some Diptera. These chromosomes are very long and thick. Hence they are known as Giant chromosomes. They are first discovered by Balbiani in 1881 in dipteran salivary glands and thus also known as salivary gland chromosomes. Giant chromosomes have also been discovered in suspensors of young embryos of many plants, but these do not show the bands so typical of salivary gland chromosomes.

4. Diploid and Haploid cell?

Diploid cells are body cells. They are called as (2n) cells. Examples: skin cells, brain cells, bone cells, blood cells. In humans, ~ 220 types of somatic cells.

Haploid cells Sex cells produce gametes. Gametes are haploid (n) cells. Sperms and ova are gametes which are produced in males and females respectively

5. Nucleosome and nucleotide?

Nucleosome: A structural unit of a eukaryotic chromosome, consisting of a length of DNA coiled around a core of histones.

Nucleotide: A compound consisting of a nucleoside linked to a phosphate group. Nucleotides form the basic structural unit of nucleic acids such as DNA.

6. Method to Change Euchromatin too heterochromatin?

Histone methylation, deacetylation, Corepressor Complex

7. Law of independent assortment with example?

Alleles for different traits are distributed to sex cells independently of one another. Traits are transmitted to offspring independently of one another.

Example: Dihybrid cross, true-breeding plants for two traits. For example, a plant that had green pod color and yellow seed color was cross-pollinated with a plant that had yellow pod color and green seeds. The traits for green pod color (GG) and yellow seed color (YY) are dominant. Yellow pod color (gg) and green seed color (yy) are recessive. F1 plants heterozygous GgYy

8. Nucleosome and write note on different kind of histone (protein)?

Nucleosome: A structural unit of a eukaryotic chromosome, consisting of a length of DNA coiled around a core of histones.

Five abundant histones are H1, H2A, H2B, H3 and H4.

9. Scaffold chromosome?

Scaffold: 1. In genetics, the **chromosome** structure consisting entirely of nonhistone proteins remaining after all the DNA and histone proteins have been removed from a **chromosome**. 2. In genomic mapping, a series of contigs that are in the right order but not necessarily connected in one continuous stretch of sequence.

10. Difference between S phase and G2 phase, G1 phase?

S phase: Synthesis of new DNA for daughter cells.

G1: new cell absorbs nutrients and grows larger. **G2:** Cell continues to grow, gets too large, needs to divide.

11. What is chromosome topology

Chromosome compaction is a necessary feature of all living cells including bacteria. It is intricately linked to **chromosome topology** and the selective pressures introduced by gene organization along the genome sequence. ... This is referred to as the “transverse” **chromosome topology**.

12. Role of cisplatin in cancer treatment?

Cisplatin is a chemotherapy medication used to treat a number of cancers. This includes testicular cancer, ovarian cancer, cervical cancer, breast cancer, bladder cancer, head and neck cancer, esophageal.

13. Positional cloning

Positional cloning is a laboratory technique used to locate the position of a disease-associated gene along the chromosome. This approach works even when little or no information is available about the biochemical basis of the disease. **Positional cloning** is used in conjunction with linkage analysis.

14. How Mendel prove heredity in variation a in among individual?

15. Chemical use of banding?

16. Mitotic apparatus?

The spindle **apparatus** (or **mitotic spindle**) refers to the cytoskeletal structure of eukaryotic cells that forms during cell division to separate sister chromatids between daughter cells. ... Besides chromosomes, the spindle **apparatus** is composed of hundreds of proteins.

17. Recombinant frequency?

Frequency of recombinant offspring reflected distances between genes on chromosomes.

18. Number of chromosome in nucleus eukaryotic is called?

There are many chromosomes in eukaryotes which are linear and made of chromatin, a nucleoprotein – histones. These chromosomes are found in a nucleus. Eukaryotic chromosomes are condensed and visible during cell division.

19. H.T Morgan experiment?

Eye color trait is linked with sex of drosophila Morgan with an experiment proved that eye color trait is linked with sex of the drosophila.

Experiment: Male flies were with white eyes (mutant). Female flies were with red eyes (wild type). Male flies with white eyes Female flies with red eyes.

20. Linkage mapping?

Linkage mapping is critical for identifying the location of genes that cause genetic diseases.

21. Gene linkage mapping and recombination frequency?

A genetic map is a map based on the frequencies of recombination between markers during crossover of homologous chromosomes.

22. Inter-phase and phase of cell cycle?

Interphase is the **phase** of the **cell cycle** in which a typical **cell** spends most of its life. During this **phase**, the **cell** copies its DNA in preparation for mitosis. ... This **phase** was formerly called the resting **phase**.

23. Dominant and recessive trait definition?

A **dominant trait** is one that is phenotypically expressed in heterozygotes. A **dominant trait** is opposed to a **recessive trait** which is expressed only when two copies of the **gene** is present.

24. Marker use in mapping?

Markers used Microsatellites. Restriction fragment length polymorphisms (RFLPs).

25. Effect linkage on inheritance?

Morgan did another experiment with fruit flies to see how linkage affects the inheritance of two different characters.

Body color – wild type gray, mutant black.

Wing size – wild type Normal, mutant vestigial.

Results -linkage and cross over According to independent assortment, four phenotypes in 1:1:1:1 ratio. Observed large number of wild-type and double-mutant flies.

26. Genetic sub discipline?

There are four sub disciplines of genetics which are as follows, although some of the Geneticist classify Genetics in many sub disciplines Transmission (Classical) Genetics, Population Genetics, Quantitative Genetics, Molecular Genetics.

27. Sister chromatids?

A **sister chromatid** refers to the identical copies (**chromatids**) formed by the replication of a chromosome, with both copies joined together by a common centromere. In other words, a **sister chromatid** may also be said to be 'one-half' of the duplicated chromosome.

28. Difference between telophase I and 2?

The **difference between telophase I** in meiosis and **telophase** during mitosis is the fact that located close to each pole of the spindle is a haploid set of chromosomes. ... Limited uncoiling occurs before the chromosomes move onto the second cell division stage in meiosis **telophase II**

29. SRY determination?

Researchers have found the SRY gene (sex determining region of the Y chromosome in individuals with the SRY gene, the generic embryonic gonads are modified into testes.

30. Continue and discontinue variation?

Variation is all the differences which exist between members of the same species. There are two kinds of **variation; continuous and discontinuous**. You should be able to give some examples of each. **Continuous variation** is **variation** that has no limit on the value that can occur within a population.

31. Gene use in drosophila?

32. Monohybrid and di-hybrid cross difference?

Mono: Cross-fertilization of true-breeding plants which are different in just one character is called as monohybrid cross. With monohybrid cross, Mendel determined the segregation of alleles at single gene locus.

Di-hybrid cross: determines that alleles at two different gene loci segregate dependently or independently.

Example: dependent or independent.

33. Define Nucleotide, Nucleoside, Purine, Pyrimidine?

A **nucleoside** consists of a pentose sugar and a nitrogenous base, but no phosphate groups.

A **nucleotide** consists of a pentose sugar and a nitrogenous base and one to three phosphate groups.

Purines and Pyrimidines are nitrogenous bases that make up the two different kinds of nucleotide bases in DNA and RNA. The two-carbon nitrogen ring bases (adenine and guanine) are purines, while the one carbon nitrogen ring bases (thymine and cytosine) are pyrimidines.

34. Map unit (Centi Morgan)?

Sturtevant expressed distance between genes - as map units. One map unit (1 cM) is equivalent to a 1% recombination frequency.

35. Prophase 2?

No replication of Chromosomes as they are already replicated. Centrioles are separated and take positions on the opposite poles of the cell. Nuclear membrane disappears. Spindle fibers form and radiate toward the center of the cell.

36. Telomeres?

The two ends of a chromosome are known as telomeres. These are required for the replication and stability of the chromosomes. When telomeres are damaged or removed due to chromosome breakage, ends can readily fuse or unite with broken ends of other chromosome.

37. Polygenic trait with example?

Most traits are not controlled by a single gene locus, but by the combined interaction of many gene loci. These traits are called polygenic traits.

Example: Human Eye, Height, pigmentation.

38. Co Domiance with example?

A situation, when both alleles appear in the phenotype. Neither allele is dominant. Both alleles are expressed in a heterozygous individuals. Parallel behavior of both allele

Example: blood Group, Roan Inheritance, Appaloose horse.

39. Incomplete domaince

Incomplete dominance is a situation in which neither allele is dominant. New phenotype appears. New phenotype is blend of both alleles

40. Reverse and forward genetics?

Reverse genetics is a method that is used to help understand the function of a gene by analyzing the phenotypic effects of specific engineered gene sequences. **Reverse genetics** usually proceeds in the opposite direction of so-called **forward genetic** screens of classical **genetics**.

41. Chromosome theory of inheritance?

The chromosomal theory of inheritance states that genes have specific loci on chromosomes.

42. Diffrence non Mendelian and mandelian?

Non-Mendelian genetics: Patterns of inheritance that deviate from a Mendelian pattern. Linkage - Non-Mendelian. Maternal effect, epigenetic inheritance, Mitochondrial inheritance etc.

In **Mendelian** inheritance, each parent contributes one of two possible alleles for a trait.

43. What happened during prophase 2?

Prophase II. Meiosis II begins without any further replication of the chromosomes. **In prophase II**, the nuclear envelope breaks down and the spindle apparatus forms. To replay the **prophase II** animation, click the Replay button.

44. Spermatogenesis and oogenesis?

Spermatogenesis: Four sperm cells are produced from primary spermatocyte.

Oogenesis: The polar bodies die. Only one ovum (egg) is produced from each primary oocyte.

45. Monocot and dicot difference?

Dicots in general, have a higher number of chromosomes than monocots. Chromosomes are longer in **monocot** than dicots

46. Cen DNA and Domain?

Within the centromere region, ...locations where spindle fibers attach which consist of DNA as well as protein. The actual location where the attachment occurs is called the kinetochore and is composed of both DNA and protein. The

DNA sequence within these regions is called CEN DNA ..120 base pairs long and consists of sub-domains, CDE-I, CDE-II and CDE-III.

47. Which type of cell division is present in somatic cell?

Diploid

48. Define Phenotype and genotype?

Genotype and Phenotype: Genetic make-up of an organism is called Genotype while physical appearance of an organism is called Phenotype.

49. Component of typical chromosome?

50. G-C rule?

Stated that (G+C) % is constant within a species, but often differs between species.

51. Banding types of Chromosome and two chemicals?

Q Banding: Q bands are the fluorescent bands observed after quinacrine mustard staining with UV light. The distal ends not stained by this technique.

R Banding: The R bands (reverse) are those located in the zones that do not fluoresce with the quinacrine mustard that is they are between the Q bands and can be visualized as green.

C Banding: The C bands correspond to constitutive heterochromatin.

Chemical?

52. Meioses I and Meioses II?

53. Pure Cross and Hybrid Cross?

Pure Cross: A cross between a true breed plant/animal with another true breed's plant/animal is called pure cross.

Hybrid Cross: An Organism that is the offspring of genetically dissimilar parents in other word offspring produce by breeding in plants or animals?

Prokaryotic eukaryotic Chromosome?

In **prokaryotes**, the circular **chromosome** is contained in the cytoplasm in an area called the nucleoid. In contrast, in **eukaryotes**, all of the cell's **chromosomes** are stored inside a structure called the nucleus. Each **eukaryotic chromosome** is composed of DNA coiled and condensed around nuclear proteins called histones.

Types of chromosome?

Autosome

Sex chromosome