

Bio301

1) What are acquired and inherited variations?

Inherited causes of **variation**. **Variation** in a characteristic that is a result of genetic **inheritance** from the parents is called **inherited variation**. Children usually look a little like their father, and a little like their mother, but they will not be identical to either of their parents. An **acquired** characteristic is a non-heritable change in a function or structure of a living biotic material caused after birth by disease, injury, accident, deliberate modification, **variation**, repeated use, disuse, or misuse, or other environmental influences.

2) What is co dominance with 3 examples?

Examples of **codominance** include a person with type AB blood, which means that both the A allele and the B allele are equally expressed. Another **example** is roan fur in cattle, in which white and red hair is equally expressed.

3) What are spermatogenesis and oogenesis?

Meiosis, the process by which gametes are formed, can also be called gametogenesis, literally "creation of gametes." The specific type of meiosis that forms sperm is called **spermatogenesis**, while the formation of egg cells, or ova, is called **oogenesis**.

4) Why gene density is high in Prokaryotes?

Seemingly simple organisms, such as **bacteria** and amoebas, have a much **higher gene density** than humans. ... This is due several factors, including that the fact that bacterial DNA has no introns. There are also fewer codons in bacterial **genes**.

5) What is polytene gene? give example.

Polytene chromosomes are large chromosomes which have thousands of DNA strands. They provide a high level of function in certain tissues such as salivary glands.^[1] Polytene chromosomes are first reported by E.G. Balbiani in 1881. Polytene chromosomes are found in dipteran flies: the best understood are those of Drosophila, Chironomus and Rhynchosciara. They are present in another group of arthropods of the class Collembola, a protozoan group Ciliophora, mammalian trophoblasts and antipodal, and suspensor cells in plants.^[2] In insects, they are commonly found in the salivary glands when the cells are not dividing.

6) what is interphase and enlist phases of cell cycle.

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Let's enter the cell cycle just as a cell forms, by division of its mother cell. What must this newborn cell do next if it wants to go on and divide itself? Preparation for division happens in three steps: G1 phase S phase G2 phase the four phases are as follows prophase, metaphase, anaphase, telophase

7) No. of chromosomes in Gold fish chicken fruit fly

8) write experiment of T. H. Morgan with examples

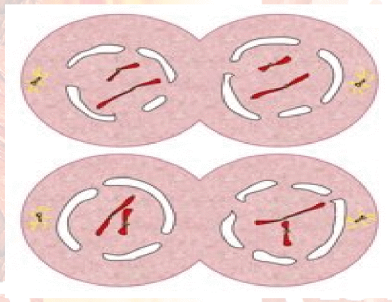
Eye color trait is linked with sex of drosophila

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**

Progeny f1 was with red eyes

All the flies produced during F1 generation were with red eyes. **Progeny f2 showed 3:1 ratio** F2 generation showed 3:1 (three red eye: one white eye). White-eyed trait appeared only in males. All females and half males with red eye. **White eyed trait appeared only in males** White-eyed trait appeared only in male fruit flies (*Drosophila melanogaster*). **Morgan's Discovery:**

Transmission of X chromosome correlates with inheritance of eye color trait First solid evidence indicating that a gene is associated with a specific chromosome



9) what do u know about telophase II ?

During telophase II, the fourth step of meiosis II, the chromosomes reach opposite poles, cytokinesis occurs, the two cells produced by meiosis I divide to form four haploid daughter cells, and nuclear envelopes (white in the diagram at right) form. When telophase II is over, the two cells are entirely separated and their nuclear membranes are fully formed. Meiosis is then complete.

10) difference between prokaryotic and eukaryotic chromosomes?

In **prokaryotes**, the circular **chromosome** is contained in the cytoplasm in an area called the nucleoid. In contrast, in **eukaryotes**, all of

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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.

11) Define lagging or leading strands, Okazaki fragments, chromatids?

A **lagging strand** is one of two **strands** of DNA found at the replication fork, or junction, in the double helix; the other **strand** is called the **leading strand**.

A **lagging strand** requires a slight delay before undergoing replication, and it must undergo replication discontinuously in small fragments. **Okazaki fragments** are short, newly synthesized DNA fragments that are formed on the lagging template strand during DNA replication. They are complementary to the lagging template strand, together forming short double-stranded DNA sections. Each of the two thread-like strands into which a chromosome divides longitudinally during cell division. Each contains a double helix of DNA.

12) What is prophase stage of mitosis?

Prophase is the first **phase of mitosis**, the process that separates the duplicated genetic material carried in the nucleus of a parent cell into two identical daughter cells. During **prophase**, the complex of DNA and proteins contained in the nucleus, known as chromatin, condenses.

13) Explain genetic data?

Definition. A **genetic database** is one or more sets of **genetic data** (**genes**, **gene products**, variants, phenotypes) stored together with software to enable users to retrieve **genetic data**, add **genetic data** and extract information from the **data**.

14) Explain sickle cell anemia?

Sickle cell anemia (**sickle cell disease**) is a disorder of the blood caused by an inherited abnormal **hemoglobin** (the oxygen-carrying protein within the red blood **cells**). The abnormal hemoglobin causes distorted (sickled) red blood **cells**. The sickled red blood **cells** are fragile and prone to rupture.

15) Why gene density is high in prokaryotes??

Seemingly simple organisms, such as **bacteria** and amoebas, have a much **higher gene density** than humans. ... This is due several factors, including that the fact that bacterial DNA has no introns. There are also fewer codons in bacterial **genes**.

16) Write type of banding in chromosome??

G-banding, **G banding**, or Giemsa **banding** is a technique used in cytogenetics to produce a visible karyotype by staining condensed **chromosomes**. ...

Heterochromatic regions, which tend to be rich with adenine and thymine (AT-rich) DNA and relatively gene-poor, stain more darkly in **G-banding**.

17) What is SRY and its importance??

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Testis Determining Factor(TDF) is **the SRY** protein. This gene is responsible for **the** initiation of male sex determination **in** humans. **The SRY** protein is a transcription factor, which attaches (binds) to specific regions of DNA and helps control **the** activity of particular genes.

The SRY gene is found on the **Y chromosome**. The sex-determining region Y protein produced from this gene acts as a **transcription factor**, which means it attaches (binds) to specific regions of **DNA** and helps control the activity of particular genes.

18) Difference between monocot chromosomes and dicot chromosomes?

In general, plants have longer chromosomes than animals. Species having less chromosome number usually have long chromosomes. Dicots in general, have a higher number of chromosomes than monocots. Chromosomes are longer in monocot than dicots.

19) Names of gene used in gene mapping of drosophilla and write its recombination frequency?

A linkage map is a genetic map of a species that shows the position of its known genes or genetic markers relative to each other in terms of recombination frequency.

Recombination frequency between cn and b is 9% Between cn and vg is 9.5%

Recombination frequency between b and vg is 17%

20) Define CEN- DNA and write its sub domains?

Yeast centromeric **DNA (CEN DNA)** binding factor 3 (CBF3) is a multisubunit protein complex that binds to the essential CDEIII element in **CEN DNA**. ...

Assembly of CBF3–**CEN DNA** complexes was performed by combining purified CBF3 proteins with a **DNA** fragment that includes the **CEN** region from yeast chromosome III.

21) Define interphase and enlist its phases of cell cycle?

the resting phase between successive mitotic divisions of a cell, or between the first and second divisions of meiosis.

22)What is chromosomal theory of inheritance.law of independent assortment?

Mendel proposed the **law of segregation** and the **law of independent assortment** to explain the **inheritance** behind his pea plant traits. A hundred years later, Boveri and Sutton developed the **chromosome theory of inheritance**, which stated that **chromosomes** were responsible for the **heredity** Mendel observed

23) Why Mendel choose pea garden for experiment?

Easy to Cultivate: Pea plant (*Pisum sativum*) was easy to cultivate. It grew well in his garden. Hermaphrodite: Its flowers were hermaphrodite i.e. pea plant have both male and female sexual organs. Short Generation Time
Many Distinct Traits:

24) Why expectations of Mendel law of inheritance?

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Gregor **Mendel** crossed various pure lines of garden peas and, by following their hybrid progeny, observed that traits are **inherited** as alternate states of independent units of **inheritance** or genes (which **Mendel** called “factors”), and that these units come in pairs.

25) Define G-C Rule & Cluster Rule?

Chargaff's legacy. Of Chargaff's four **rules** on DNA base composition, only his first parity **rule** was incorporated into mainstream biology as the DNA double helix. Now, the **cluster rule**, the second parity **rule**, and the **GC rule**, reveal the multiple levels of information in our genomes and potential conflicts between them.

26) What are properties of genetic data?

A **genetic** database is one or more sets of **genetic data** (**genes**, **gene products**, variants, phenotypes) stored together with software to enable users to retrieve **genetic data**, add **genetic data** and extract information from the **data**.

27) differ chromosome and chromatin?

DNA exists in **Chromatin** form in the nucleus. The **chromatin** condenses to form **Chromosomes** during cell division. The **chromatin** in the nucleus forms a 'beads-on-string' structure or Nucleosome. The 'beads' are octamer histone proteins and the 'string' is the double-stranded DNA.

28) describe prophase II?

Meiosis II: 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. ... The nuclear envelope breaks down, and the spindle apparatus forms.

29) Define autoradiography?

An **autoradiograph** is an image on an x-ray film or nuclear emulsion produced by the pattern of decay emissions (e.g., beta particles or gamma rays) from a distribution of a radioactive substance. ... The film or emulsion is apposed to the labeled tissue section to obtain the **autoradiograph** (also called an **autoradiogram**).

30) What are 3 domains of protein?

A **protein domain** is a conserved part of a given **protein** sequence and (tertiary) structure that can evolve, function, and exist independently of the rest of the **protein** chain. Each **domain** forms a compact three-dimensional structure and often can be independently stable and folded.

31) How Plasmid as a cloning vector using high & low molecular weight?

Conjugative: **high** molecular weight and have one to three copies per cell. Non conjugative: **Low molecular weight** and have multiple copies per cell. Host range: It is determined **by** its ori region.[3] It can be either broad host range or

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restricted host range. Col E1 has restricted host range and promiscuous *plasmids* have

32) What are Ancient pregnancy test?

33) What are primary secondary tertiary & quaternary structure of a protein?

the different levels of **protein structure** are known

as **primary, secondary, tertiary, and quaternary structure**. The **primary structure** is the sequence of amino acids that make up a polypeptide chain. ...

The exact order of the amino acids in a specific **protein** is the **primary** sequence for that **protein**.

34) What are electrophoration techniques?

Electroporation, or electroporabilization, is a microbiology **technique** in which an electrical field is applied to cells in order to increase the permeability of the cell membrane, allowing chemicals, drugs, or DNA to be introduced into the cell.

35) define nucleotides?

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

36) define isopycnic centrifuge?

medical **Definition of isopycnic**. 1 : of, relating to, or marked by equal or constant density. 2 : being or produced by a technique (as **centrifugation**) in which the components of a mixture are separated on the basis of differences in density.

37) how plasmids play important role in microbial resistance against antibiotics?

38) what is the length of major and minor groove, also write the number of nucleotides in major groove?

The strand backbones are closer together on one side of the helix than on the other. The **major groove** occurs where the backbones are far apart, the **minor groove** occurs where they are close together. The grooves twist around the molecule on opposite sides. Certain proteins bind to DNA to alter its structure or to regulate transcription (copying DNA to RNA) or replication (copying DNA to DNA). It is easier for these **DNA binding proteins** to interact with the bases (the internal parts of the DNA molecule) on the major groove side because the backbones are not in the way.

39) What is Franklin and Wilkins work?

Genes are encoded in the sequence of bases." ii) "The double helix model was supported by the **work** of Rosalind **Franklin** and Maurice **Wilkins**." b) on the helices: i) "The structure of DNA was discovered in 1953 by Francis Crick and James Watson while Watson lived here at Clare."

40) Name of 3 bonding parts which make complete nucleotide?

a **nitrogenous base**, a **pentose sugar**, and a **phosphate**

41) What are Natural plasmid?

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Plasmids found in nature often give their hosts beneficial traits that allow them to survive in competitive environments. Plasmids derived directly from the environment are sometimes called '**natural plasmids**', to distinguish them from the modified versions we usually work with in the lab.

42)What are Green technology give 1 example

One of the best known examples of green technology would be the [solar cell](#). A [solar cell](#) directly converts the energy in light into electrical energy through the process of photovoltaics. Generating electricity from solar energy means less consumption of fossil fuels, reducing pollution and greenhouse gas emissions.

43) Name some factors which help in the mobility of DNA?

44)What is role of meiosis and mitosis in animal body?

Mitosis and meiosis. ... There are two ways cell division can happen in humans and most other **animals**, called **mitosis** and **meiosis**. When a cell divides by way of **mitosis**, it produces two clones of itself, each with the same number of chromosomes. When a cell divides by way of **meiosis**, it produces four cells, called gametes.

45)What are mendelian and non mendelian genetics.

Non-Mendelian inheritance is a general term that refers to any pattern of **inheritance** in which traits do not segregate in accordance with **Mendel's** laws. ... In **Mendelian inheritance**, each parent contributes one of two possible alleles for a trait.

46)What are genotype and phenotype

Genotype and phenotype are very similar-sounding words that are related, but actually mean different things. The **genotype** is the set of genes in our DNA which is responsible for a particular trait. The **phenotype** is the physical expression, or characteristics, of that trait.

47)What is unit map?

RFLP used for constructing genetic maps : RFLPs can be used to measure recombination rates which can lead to a genetic map with the distance between RFLP loci.

48)What is law of independent assortment?

the principle, originated by Gregor Mendel, stating that when two or more characteristics are inherited, individual hereditary factors assort **independently** during gamete production, giving different traits an equal opportunity of occurring together. Expand. Also called Mendel's second **law**, Mendel's **law**.

49)What is chromosome scaffold ?

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

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are in the right order but not necessarily connected in one continuous stretch of sequence.

50) What is Human genome and bacterial genome?

Human genome: All the genetic information in a person. The **human genome** is made up of the DNA in chromosomes as well as the DNA in mitochondria.

Most **bacteria** have a **genome** that consists of a single DNA molecule (i.e., one chromosome) that is several million base pairs in size and is "circular" (doesn't have ends like chromosomes of eukaryotic organisms).

51) What is Size of human gene?

The genes range in size from 994 to **41.8 kb** for mouse (average length = **7902 bp**, s.d. = 6391) and from 1148 to **37.7 kb** for human (average length = **8446 bp**, s.d. = 7124). The number of exons range from 1 to 41 per/gene (average = 8.4, s.d. = 6.9).

52) RM nomenclature given by?

53) Western blotting technique used for?

The western blot (sometimes called the protein immunoblot) is a **widely used analytical** technique used in molecular biology, immunogenetics and other molecular biology disciplines to detect specific proteins in a sample of tissue homogenate or extract.

54) Define proteomic?

the study of proteomes and their functions.

55) Define palindromic sequence?

A **palindromic sequence** is a nucleic acid **sequence** on double-stranded DNA or RNA wherein reading 5' (five-prime) to 3' (three prime) forward on one strand matches the **sequence** reading 5' to 3' on the complementary strand with which it forms a double helix. ... A **palindromic** nucleotide **sequence** can form a hairpin.

56) What is Electroporation technique?

Electroporation, or **electropermeabilization**, is a microbiology technique in which an electrical field is applied to cells in order to increase the permeability of the cell membrane, allowing chemicals, drugs, or DNA to be introduced into the cell.^[1] In microbiology, the process of electroporation is often used to transform bacteria, yeast, or plant protoplasts by introducing new coding DNA. If bacteria and plasmids are mixed together, the plasmids can be transferred into the bacteria after electroporation, though depending on what is being transferred cell-penetrating peptides or CellSqueeze could also be used. Electroporation works by passing thousands of volts across a distance of one to two millimeters of suspended cells in an electroporation cuvette (1.0 – 1.5 kV, 250 – 750V/cm). Afterwards, the cells have to be handled carefully until they have had a chance to divide, producing new cells that contain reproduced

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plasmids. This process is approximately ten times more effective than chemical transformation.

57) What is Fredrick Griffith experiment?

Griffith's Experiments: The first clue that DNA was the carrier of hereditary information came from the work of Fred Griffith in 1928. He observed the phenomenon of Transformation in the bacterium *Streptococcus pneumoniae*. Griffith had isolated different strains of *S. pneumoniae*. In the virulent strain, each bacterium is surrounded by a polysaccharide coat. This polysaccharide coat makes the bacterial colony appear smooth when grown on an agar plate. These forms of *S. pneumoniae* are referred to as S forms. Griffith found that these virulent forms occasionally get mutated to non-virulent forms, which lack a polysaccharide coat. They produced a rough appearing colony on an agar plate; these forms are referred to as R forms. **Transformation Experiments** Griffith carried out series of experiments using S-Form & R-Form strains of *S. pneumoniae* and mouse as an experimental animal.

58) difference between mendelian and non-mendelian genetics haploid and diploid cell properties of genetics?

Non-Mendelian inheritance is a general term that refers to any pattern of **inheritance** in which traits do not segregate in accordance with **Mendel's** laws. ... In **Mendelian inheritance**, each parent contributes one of two possible alleles for a trait. The main difference between haploid and diploid cells is the number of chromosome sets found in the nucleus. Ploidy is the area of biology that refers to the number of **chromosomes** in a cell. Therefore, cells with two sets are diploid, and those with one set are haploid. The term "genetic characteristics" can refer to a genotype, which is the specific DNA sequence that codes for a trait, or a phenotype, which is how the specific DNA sequence manifests itself in the organism -- often, but not always, the phenotype is how the organism **looks**.

59) Define Nucleosome and write types of histone protein?

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

Five **types of histones** have been identified: H1 (or H5), H2A, H2B, H3 and H4, the core **histones** are H2A, H2B, H3, and H4, and the linker **histones** are H1 and H5. H1 and its homologous **protein** H5 are involved in higher-order structures of **chromatin**. The other four **types of histones** associate with DNA to form nucleosome.

60) Define locus Chromosome scaffold Difference between chromosome and chromatids?

The collection of **Chromosome** assemblies, unlocalized and unlocalized sequences and alternate **loci** that represent an organism's genome. And

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Any **locus** may be represented 0, 1 or >1 time, but entire **chromosomes** are only represented 0 or 1 times. ... A genome patch is a **scaffold** sequence that is part of a minor genome release.

A **chromosome** is made up of two **chromatids** which are joined by the centromere. The **chromatids** separate from each other during mitosis to form two new **chromosomes**. The DNA making up a **chromosome** is dispersed as chromatin.

61) Difference between meiosis I and meiosis II

In **meiosis II**, these chromosomes are further separated into sister chromatids. **Meiosis I** includes crossing over or recombination of genetic material between chromosome pairs, while **meiosis II** does not. This occurs in **meiosis I** in a long and complicated prophase I, split into five sub-phases.

62) Define following terms Okazaki fragments?

During lagging strand synthesis, DNA ligase I connects the **Okazaki fragments**, following replacement of the RNA primers with DNA nucleotides by DNA polymerase δ . **Okazaki fragments** that are not ligated could cause double-strand-breaks, which cleaves the DNA.

63) What is Leading and lagging strand?

When replication begins, the two parent DNA **strands** are separated. One of these is called the **leading strand**, and it is replicated continuously in the 3' to 5' direction. The other **strand** is the **lagging strand**, and it is replicated discontinuously in short sections.

64) What is Sub genetic information?

The **material** inside the nucleus of cells that carries **genetic information**. Example of lay language for DNA: "The **genetic material** inside your cells." ... encoded in the **genes**' DNA is used to make protein and RNA molecules.