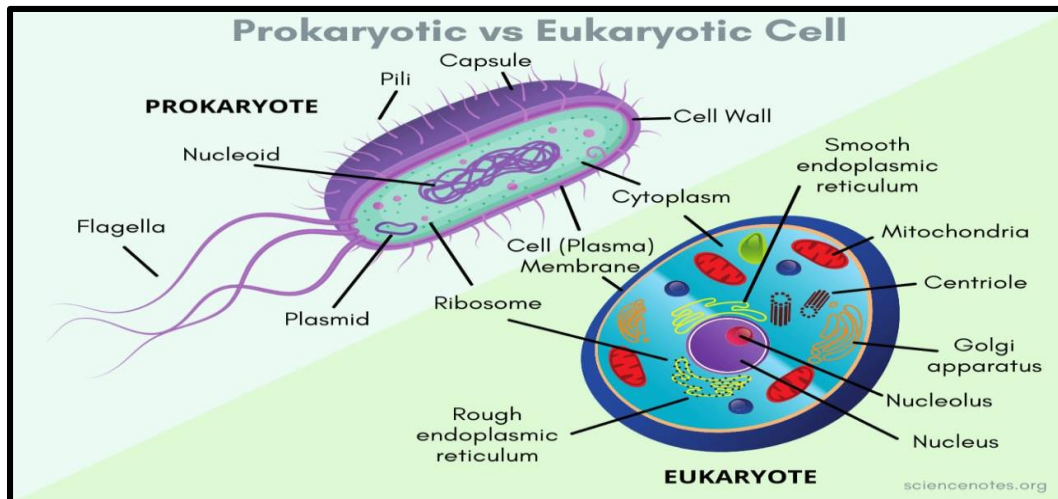


B.Sc. 1st Semester

CYTOLOGY, GENETICS AND INFECTIOUS DISEASES

1-Question: Give Differences between Prokaryotic and Eukaryotic cell.

Answer: Differences between Prokaryotic and Eukaryotic cell



Prokaryotic vs Eukaryotic Cells

FEATURE	PROKARYOTIC CELLS	EUKARYOTIC CELLS
Definition	Single-cell organisms , no nucleus	Complex organisms, with nucleus
Examples	Bacteria, Archaea	Animals, Plants, fungi
Cell Size	Smaller, typically 0.1–5.0 µm in diameter.	Larger, usually 10–100 µm in diameter.
Mitochondria	Absent, energy produced in cytoplasm	Present, powerhouse of the cell
Cytoplasm	Present, site of metabolic processes	Present, holds organelles in place
Endoplasmic Reticulum	Absent, simpler protein synthesis	Present, crucial for protein synthesis
Plasmids	Present, small circular DNA	Rare, except in some fungi and plants
Nucleus	Absent, DNA floats freely	Present, contains and protects DNA
Organelles	Few, simpler structure	Many, specialized functions
DNA Structure	Single, circular chromosome	Multiple, linear chromosomes
Ribosomes	70S, smaller.	80S, larger.
Locomotion	Simple flagella, direct movement	Complex flagella, cilia for movement

Question 2: Explain Cell Theory.

Answer: Cell Theory

Scientist	Contribution	Year
Robert Hooke (1635–1703)	- Observed cork cells using a simple microscope and coined the term "cell" (from Latin <i>cella</i> – a small room). - First to see and name cells.	1665
Antonie van Leeuwenhoek (1632–1723)	- Improved the microscope and observed living cells (bacteria, protozoa, red blood cells, etc.). - Showed that cells are the basic units of life.	1674–1683
Matthias Schleiden & Theodor Schwann (1838–1839)	- Schleiden concluded that all plants are made of cells. - Schwann concluded that all animals are made of cells. - Together, they proposed the first formal cell theory.	1838–1839

The Cell Theory

The modern cell theory is based on the combined work of all these scientists and is made up of three main principles:

1

All living organisms are made up of cells.

- Every living thing, from the simplest bacteria to the most complex human, is composed of one or more cells.
- Even the largest organisms (like a whale or a tree) are made up of many cells.
- The cell is the basic structural and functional unit of life.

2

The cell is the basic unit of structure and function.

- Cells perform all essential life processes, such as nutrition, respiration, excretion, growth, and reproduction.
- The functions of the whole organism depend on the coordinated activities of its cells.
- Cells contain organelles that carry out specific functions (e.g., mitochondria for energy production, chloroplasts for photosynthesis).

3

All cells arise from pre-existing cells.

- New cells are formed only by the division of existing cells (cell division: mitosis or meiosis).
- Cells do not arise spontaneously from non-living matter.
- This principle explains growth, repair, and reproduction in all living organisms.

Significance of the Cell Theory

- Forms the foundation for modern biology and the study of life.
- Helps us understand growth, development, heredity and disease.
- Essential for advancements in medicine, biotechnology and genetics.
- Guides research in agriculture, ecology and environmental science.
- Provides a unifying concept for all living organisms, from microbes to humans.

Key Points to Remember

- The cell theory applies to all living organisms – plants, animals, fungi, protists and bacteria.
- Viruses are not considered living organisms because they are not made of cells.
- Cells may be microscopic (e.g., bacteria) or macroscopic (e.g., egg cells of some animals).
- The cell theory is a cornerstone of modern biology and continues to be supported by new discoveries, such as stem cells and synthetic biology.

3 Question: What is Microtubules? Describe the major functions of Microtubules.

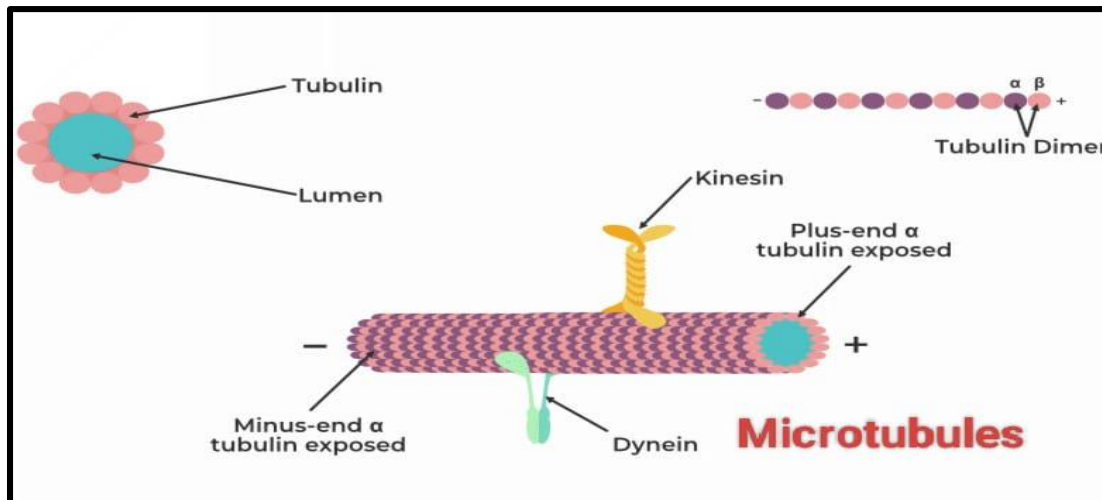
Answer: Microtubules

Microtubules are biopolymers of tubulin that form part of the cytoskeleton to provide structure and shape to a eukaryotic cell. Each tubulin is made of an alpha and a beta-tubulin attached to each other. Microtubules can be as long as 50 micrometres, as wide as 23 to 27 nm and have an inner diameter between 11 and 15 nm. Microtubules are hollow, rigid, cylindrical structures which occur in almost all the eukaryotic cells except mammalian RBCs. It consists of the proto filaments which are of 13 subunits.

Functions

1. Cell Movement: Microtubules give structures to cilia and flagella. They also facilitate the contraction and expansion of the cell helping them to move from one place to another.

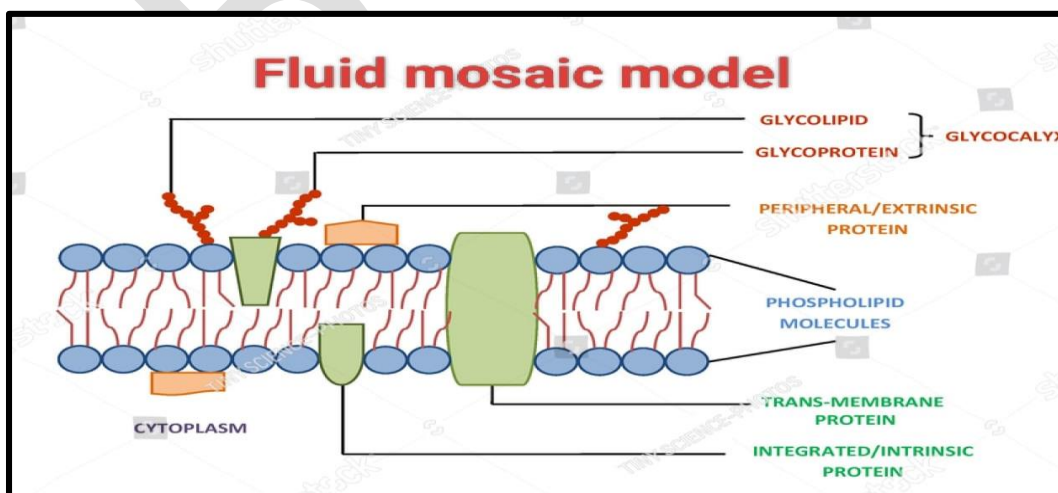
2. **Cell Division:** Microtubules play a serious role in forming the mitotic spindles. These mitotic spindles organize and separate the chromosomes during cell division.
3. **Cell Transport:** Microtubules help in the movement of organelles inside the cytoplasm of the cells. They also help various areas of the cell to communicate with each other.
4. **Cell structure:** They act like rigid tent poles to give the cell its shape and resist crushing.



4 Question: Give an account of Fluid mosaic model of plasma membrane.

Answer: Fluid mosaic model of plasma membrane

Fluid mosaic model Proposed by **S. J. Singer** and **G. L. Nicolson** in 1972. The plasma membrane is made of a phospholipid bilayer with proteins embedded in it. Phospholipids and some proteins can move laterally within the membrane. The membrane is selectively permeable, controlling the movement of substances into and out of the cell. Different types of proteins are arranged irregularly within the lipid bilayer, giving a mosaic appearance. Integral proteins are embedded in or pass through the bilayer, while peripheral proteins are attached to its surface. Cholesterol helps maintain membrane stability and fluidity. Carbohydrates occur on the outer surface as glycoproteins and glycolipids.



5 Question: What is Exocytosis? Describe it.

Answer: Exocytosis

Exocytosis is an active transport process where a cell moves large molecules or waste out through its cell membrane.

During this process, a small sac called a vesicle carries the material inside the cell. This sac moves to the outer edge, fuses with the cell membrane, and opens up to release the contents outside.

Types of Exocytosis

Constitutive Exocytosis: Happens continuously in all cells. It releases default materials and helps build the cell membrane.

Regulated Exocytosis: Happens in special cells like nerve or hormone-producing cells. It releases contents only when the cell gets a specific chemical or electrical signal

Functions

1. **Waste Removal:** Pushing out leftover debris that is too big to pass through the membrane normally.
- 2 **Cell Signaling** : Releasing hormones like insulin or neurotransmitters to talk to other cells.
3. **Membrane Repair:** Adding new lipids and proteins to fix tears in the outer cell wall.

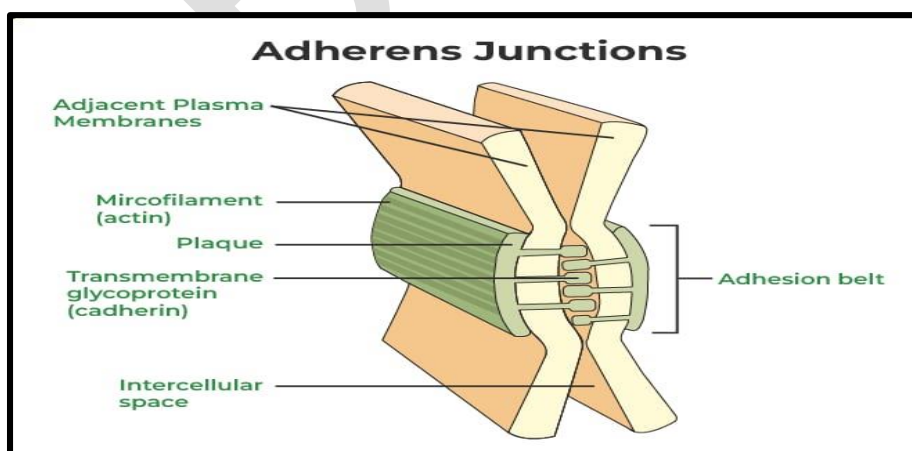
6 Question: Describe Adherens junction and its functions.

Answer: Adherens junction

Adherens junctions are cell-to-cell junctions found mainly on the lateral surfaces of epithelial cells, just below tight junctions. They provide strong adhesion between neighbouring cells. The main adhesion proteins are cadherins, which bind to cadherins on adjacent cells. Cadherins are linked inside the cell to actin filaments through proteins such as catenins.

Functions

1. They help maintain tissue shape, strength and integrity.
2. They are also important in cell movement and tissue development.
3. Provides strong adhesion between adjacent cells.
4. Connects neighbouring cells through actin filaments.
5. Helps maintain the shape and organization of epithelial cells.



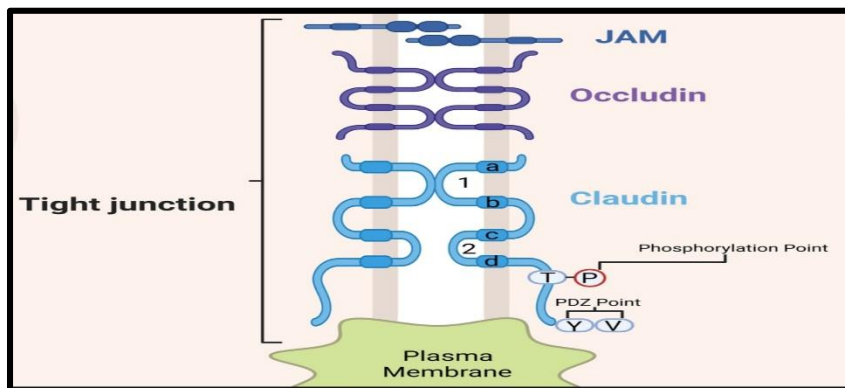
7 Question: Explain Tight junction structure and functions.

Answer: Tight junction

A tight junction (also called a zonula occludens) is a specialized intercellular connection that seals neighboring cells together to form a watertight, impermeable barrier. Found in epithelial tissues such as the intestine, kidney tubules, urinary bladder, and blood-brain barrier.

Structure:

1. Formed by transmembrane proteins
 2. Claudins
 3. Occludin
 4. Junctional adhesion molecules (JAMs)
- These proteins are connected to the actin cytoskeleton by adaptor proteins (ZO-,ZO-2,ZO-3).



8 Question: Describe functions of Mitochondria.

Answer: Functions of Mitochondria

Mitochondria are often called the “powerhouses of the cell.” Their main functions are:

1. Energy production: Produce ATP (adenosine triphosphate) through aerobic cellular respiration.
2. Oxidation of nutrients: Break down carbohydrates and fats to release energy.
3. Regulation of cell death: Help control apoptosis (programmed cell death).
4. Calcium regulation: Store and help regulate calcium ions within cells.
5. Heat production: In certain tissues, mitochondria generate heat through thermogenesis.
6. Metabolic functions: Participate in processes such as fatty-acid oxidation and synthesis of certain important molecules.
7. Detoxifying ammonia: Helps in detoxifying ammonia in the liver cells
8. Responsible for building certain parts of the blood and various hormones like testosterone and oestrogen
9. It is also involved in various cellular activities like cellular differentiation, cell signalling, cell senescence, controlling the cell cycle and also in cell growth.

9 Question: Write the Functions of Chromosomes.

Answer: Functions of Chromosomes

- 1 **Genetic information storage** - Carry genes that determine traits.
- 2 **Gene expression regulation** - Control which genes are turned on/off.
- 3 **Transmission of heredity** - Ensure genetic material is passed during cell division.
- 4 **DNA packaging** - Compact long DNA molecules into a nucleus-friendly form.

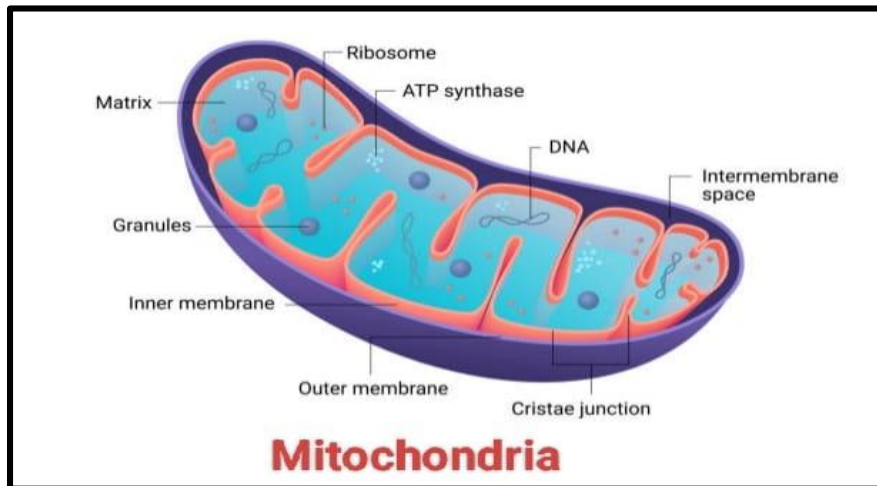
5 Cell division role - Centromere and kinetochore help proper segregation of chromatids.

6 Telomere function -Maintain chromosome stability and prevent loss of genetic information.

7 Variation & Evolution -Crossing over during meiosis increases genetic diversity.

10. Question :Mitochondria (only diagram)

Answer:



11 Question: Explain Role of Peroxisomes.

Answer: Role of Peroxisomes

1. Break down hydrogen peroxide (H_2O_2): Peroxisomes produce hydrogen peroxide during metabolic reactions. They contain the enzyme catalase, which converts hydrogen peroxide into harmless water (H_2O) and oxygen (O_2):

2. Fatty acid oxidation: Oxidation of fatty acids, in animal cells, occurs in both peroxisomes and mitochondria, but in yeasts and plants, only limited to peroxisomes. It provides a major source of metabolic energy.

3. Lipid biosynthesis: They are involved in the production of plasmalogens, which are phospholipids essential for the normal function of the brain, heart, and nerve cells. They also contribute to the synthesis of bile acids and cholesterol intermediates.

4. Detoxify harmful substances: They help detoxify substances such as alcohol, drugs, and other toxic compounds, especially in liver and kidney cells.

5. Germination of seeds; Peroxisomes in seeds responsible for the conversion of stored fatty acids to carbohydrates, critical to providing energy and raw materials for the growth of germinating plants.

6. Degradation of purines: Carry out the catabolism of purines, polyamines and amino acids especially by uric acid oxidase

7. Bioluminescence: Luciferase enzyme found in the peroxisomes of fireflies help in bioluminescence and thus aid the flies in finding a mate or its meal.

8. Plant Cell Roles: In plants, specialized peroxisomes assist with photorespiration in leaves and convert stored fatty acids into carbohydrates during seed germination.

12 Question: Give differences between DNA and RNA**Answer: Differences between DNA and RNA**

	DNA	RNA
(i)	It usually occurs inside nucleus and some cell organelles.	Most of the RNA is found in the cytoplasm.
(ii)	DNA is the genetic material.	RNA is not the genetic material except in certain viruses.
(iii)	It is double stranded with the exception of some viruses (<i>e.g.</i> , $\phi \times 174$).	RNA is single stranded with the exception of some viruses (<i>e.g.</i> , double stranded in <i>Reovirus</i>).
(iv)	DNA is of only two types; intra-nuclear and extra-nuclear.	There are atleast three types of RNAs – mRNA, rRNA and tRNA.
(v)	It contains deoxyribose sugar.	It contains ribose sugar.
(vi)	Nitrogen base in DNA includes – adenine, cytosine, guanine and thymine.	Thymine is replaced by uracil in RNA, the other three are similar – adenine, cytosine and guanine.
(vii)	Unusual bases are very few or absent.	Many unusual or modified bases are often present.
(viii)	Hydrogen bonds are formed between complementary nitrogen bases on the opposite strands of DNA (A –T, C–G).	Base pairing through hydrogen bonds occurs only in the coiled parts.
(ix)	DNA is spirally twisted to produce a regular helix.	The strand may get folded at places to produce a secondary helix or pseudohelix.
(x)	It replicates to form new DNA molecules.	It cannot normally replicate itself.
(xi)	DNA transcribes genetic information to RNA.	RNA translates the transcribed message for forming polypeptides.
(xii)	Its quantity is fixed for cell.	The quantity of RNA of a cell is variable.
(xiii)	Purine and pyrimidine bases are in equal number.	There is no proportionality between number of purine and pyrimidine bases.
(xiv)	It occurs in the form of prochromosome, chromatin or chromosomes.	It occurs in ribosomes or forms association with ribosomes.
(xv)	It is long lived.	Some RNAs are very short lived while others have somewhat longer life.

13 Question: Write Functions of Nucleus.**Answer: Functions of Nucleus**

1. Stores chromatin to preserve genetic information.
2. Acts as the control center regulating gene expression and cellular activities.
3. Synthesizes mRNA through transcription for protein synthesis.
4. Processes RNA by splicing introns and adding caps and poly-A tails.
5. Houses the nucleolus for rRNA synthesis and ribosomal subunit assembly.

6. Serves as the site of DNA replication prior to cell division.
7. Ensures accurate chromosome duplication and distribution.
8. Organizes DNA into functional domains and provides structural support.
9. Mediates transport of proteins and RNA through nuclear pores.
10. Maintains genome integrity via DNA repair mechanisms

14 Question: What is a nucleus? Describe its structure.

Answer: Nucleus

The nucleus was discovered by Robert Brown in 1831. It is a double membrane bound dense protoplasmic cell body that controls the metabolism, growth and contains all the hereditary information of a cell. Hence, it is considered director or controller of the cell. Most of the eukaryotic cells contain at least one membrane bound nucleus but are absent in mature RBCs of mammals.

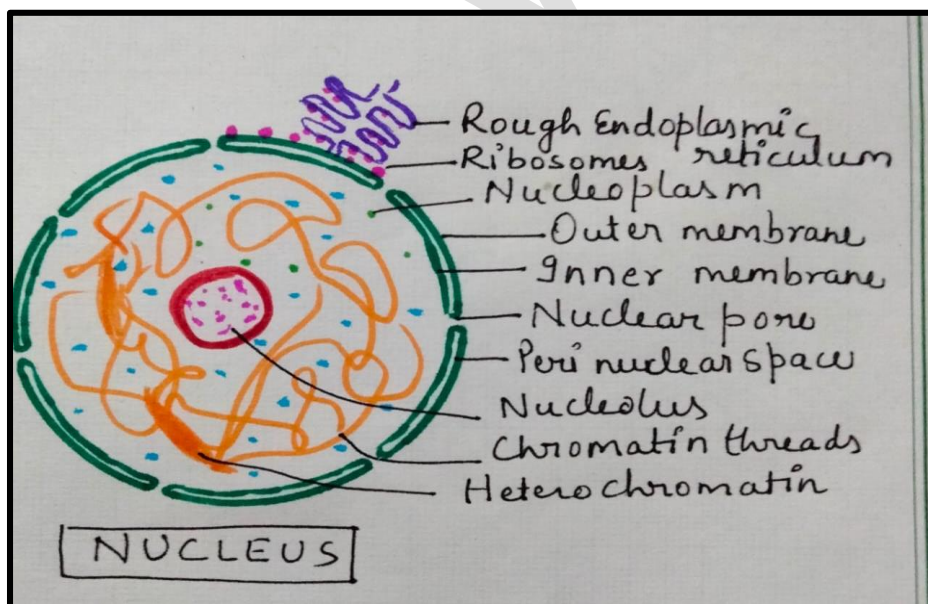
Structure

Nuclear envelope: It is a double layered covering called nuclear membrane. The space between these membranes is called perinuclear space. The outer membrane of the nucleus is a derived form of endoplasmic reticulum.

Nuclear pores: Nuclear membrane has pores which regulate the movement of materials in and out of the nucleus.

Nucleolus: Nucleolus is a spherical and non-membranous structure. It is the site of active ribosomal RNA (rRNA) synthesis.

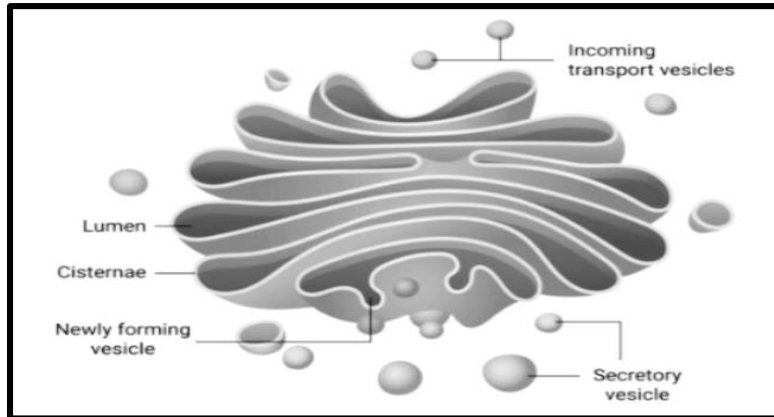
Chromatin: Chromatin is a complex of DNA and proteins, primarily histones, found in the various of eukaryotic cells. It serves to efficiently package the long DNA molecules into more compact structures, allowing them to fit inside the nucleus. Chromatin exists in two forms: Euchromatin, which is loosely packed and transcriptionally active, and heterochromatin, which is densely packed and generally inactive.



15. Write short note on Golgi body.

Answer: **Golgi body**

Golgi body or Golgi complex, is a membrane-bound organelle in eukaryotic cells. The Golgi apparatus was first observed in **1897** by Italian cytologist **Camillo Golgi**.



Structure

Cisternae: Flattened, stacked membrane-bound sacs that form the core of the organelle.

Cis face: The receiving side located near the endoplasmic reticulum.

Trans face: The shipping side where finished vesicles pinch off to target destinations

Functions

1. Modification: Alters proteins and lipids by adding chemical groups like carbohydrates (glycosylation).

2. Packaging: Encases processed molecules into vesicles.

3. Distribution: Directs molecules to lysosomes, the plasma membrane, or for secretion outside the cell

16 Question: Describe the functions of Endoplasmic Reticulum.

Answer: **functions of Endoplasmic Reticulum**

1. Mechanical function: the endoplasmic reticulum forms a skeletal frame work and provides supplementary mechanical support to the colloidal matrix.

2. Exchange of material: The membranes of endoplasmic reticulum maintain osmotic pressure within the cell, isolate the materials synthesised or delivered and regulate exchange between the inner compartments and the outer compartments.

3. Intracellular transport: The endoplasmic reticulum transport various substances inside the cell cytoplasm.

4. Intracellular transport: The endoplasmic reticulum provides an increased inner surface for various metabolic reaction.

5. Synthesis of secretory proteins: The endoplasmic reticulum are associated with the protein synthesis.

6. Glycogen metabolism: In liver cells agranular endoplasmic reticulum is associated with glycogen metabolism.

7. ATP synthesis: Membranes of endoplasmic reticulum are the sites of ATP synthesis in the cell The ATP is used as a source of energy for all the intracellular metabolism and transport of material.

8. Formation of other cytomembranes : Endoplasmic reticulum takes part in the formation of other membranous structures of cell, like mitochondria and Golgi bodies.

9. Transport of message from genetic material: It also provides passage for the message in the form of various RNAs from the genetic material to pass from the nucleus to the various organelles in the cytoplasm.

17 Question Write difference between SER and RER.

Answer:

Difference between Smooth and Rough Endoplasmic Reticulum		
Feature	Smooth Endoplasmic Reticulum (SER)	Rough Endoplasmic Reticulum (RER)
Surface	Smooth (no ribosomes).	Rough (ribosomes attached to surface).
Appearance	Tubular and branched network of membranes.	Flattened, sheet-like cisternae with small granules (ribosomes).
Ribosomes	Absent.	Present (on cytosolic surface).
Main function	• Lipid and steroid synthesis. • Detoxification of drugs and poisons. • Carbohydrate metabolism (e.g., glycogen breakdown). • Ca^{2+} storage (in muscle cells – sarcoplasmic reticulum).	• Protein synthesis (for secretion, membrane and lysosomal proteins). • Initial modification and folding of proteins. • Transport of proteins to Golgi apparatus.
Enzymes	Contains enzymes for lipid synthesis, cytochrome P450 (detoxification), etc.	Contains enzymes for protein modification (e.g., signal peptidase).
Common in	Highly developed in liver, adrenal glands, sex glands, and muscle cells.	Highly developed in protein-secreting cells (e.g., pancreas, plasma cells).
Role in cell	Helps in metabolism and detoxification.	Helps in protein production and transport.
Special feature	Forms a smooth tubular network; involved in Ca^{2+} release (sarcoplasmic reticulum).	Often appears as stacks of flattened sacs (cisternae) with ribosomes.

Smooth Endoplasmic Reticulum (SER)

Smooth, tubular network of membranes

Rough Endoplasmic Reticulum (RER)

Flattened sacs with ribosomes

18 Question: Write differences between A, B and Z DNA

Answer: Differences between A, B and Z DNA

A-DNA	B-DNA	Z-DNA
Right-handed helix.	Right-handed helix.	Left-handed helix.
Short and wide helix (23 Å in diameter).	Most stable helix (20 Å in diameter).	Most narrow helix (18 Å in diameter).
Narrow and deep major grooves; wide and shallow minor grooves.	Wide and deep major groove; narrow and deep minor groove.	Narrow and deep major grooves; wide and shallow minor grooves.
It has 11 base pairs per turn.	It has 10.5 base pairs per turn.	It has 12 base pairs per turn.
All glycosidic linkages are anti.	Glycosidic bonds are anti.	Purines are syn and pyrimidines are anti.
Dehydrated (cannot bind to water easily).	Forms in normal conditions.	Forms in hyper salinity.
Mononucleotide repeating unit.	Mononucleotide repeating unit.	Dinucleotide repeating unit.

19 Question: Explain Cell-Cell interaction

Answer: Cell-Cell interaction

Cell-cell interaction is the process by which cells communicate and interact with each other through direct contact or signaling.

Types of cell-cell interaction

1. Direct I: Cells physically touch, either through stable junctions or temporary contact.

***Stable junctions:** These are permanent structures that hold cells together in tissues.

***Transient interactions:** These are temporary connections, such as the interactions between immune cells to identify and respond to threats.

2. Indirect contact (cell signaling): Cells communicate by sending and receiving chemical signals that can travel short or long distances.

***Paracrine signaling:** Signals are sent to nearby cells.

***Autocrine signaling:** A cell signals itself.

***Endocrine signaling:** Signals are sent through the bloodstream to cells all over the body, like hormones.

20 Question: Describe the Functions of Cytoskeleton

Answer: Functions of Cytoskeleton

- 1. Structural Support:** Cytoskeleton providing structural support that helps maintain the cell shape.
- 2. Internal Framework:** It forms an internal framework which is responsible for maintaining position of various organelles within the cell.
- 3. Movement of Substances:** The microfilaments and microfibrils form a part of machinery required for the movement of materials and organelles within the cell.
- 4. Cell Movement:** Movement of unicellular organisms or cellular locomotion by certain WBCs are dependent on the force generating elements of cytoskeleton.
- 5. Changes in Cell-shape:** Changes in cell shape and movement of cells during embryonic development towards the end of gastrulation is brought about by the contraction of a band of microfilaments. These assemble in the cortical region of cells just beneath the apical cell membrane and their contraction pulls the cell cytoplasm in that direction.
- 6. Protein Synthesis:** The translation machinery of the cell remains attached with the cytoskeleton. It means it provides site for anchoring mRNA and ribosomes.
- 7. Signal Transduction:** Cytoskeleton makes contact with the inner surface of plasma membrane and plays a key role in transmitting signals from extracellular environment into the cell interior.

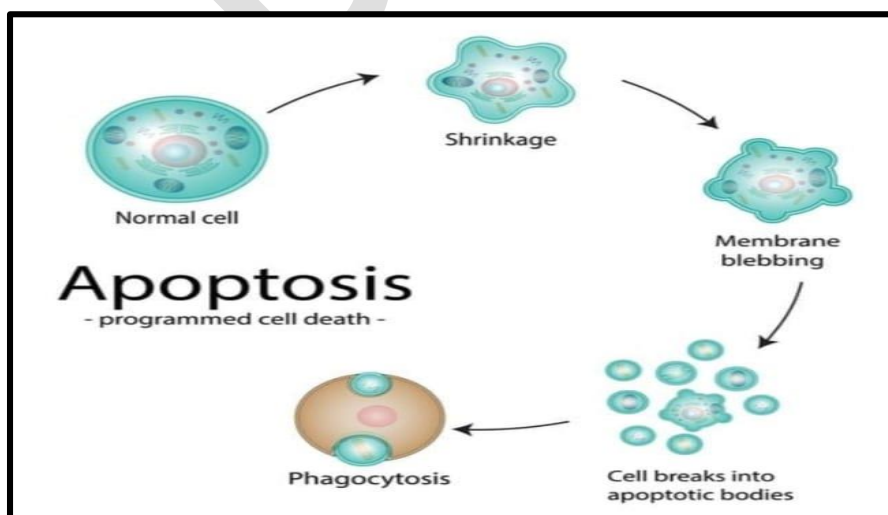
21 Question: Define Apoptosis.

Answer: Apoptosis (Programmed Cell Death)

Apoptosis is the body's natural process of programmed cell death where damaged, old, or unneeded cells self-destruct in an orderly and controlled manner. Apoptosis genetically controlled, energy-dependent process of programmed cell death. Maintains tissue homeostasis by removing unwanted, damaged, or harmful cells without causing inflammation. Also called cellular suicide.

Steps

1. Cell shrinkage (not swelling).
2. Chromatin condensation → DNA (pyknosis)
3. Fragmentation (ladder pattern).
4. Cell membrane remains intact initially but forms blebs.
5. Formation of apoptotic bodies → phagocytosis by macrophages cells



22 Question: Describe the Chromosomal Theory of Inheritance.

Answer: Chromosomal Theory of Inheritance

The chromosomal theory of inheritance was given by **Boveri** and **Sutton** in the early 1900s. It is the fundamental theory of genetics. According to this theory, genes are the units of heredity and are found in the chromosomes. The Chromosomal Theory of Inheritance was consistent with Mendel's laws and was supported by the following observations:

1. During meiosis, homologous chromosome pairs migrate as discrete structures that are independent of other chromosome pairs.

The sorting of chromosomes from each homologous pair into pre-gametes appears to be random.

2. Each parent synthesizes gametes that contain only half of their chromosomal complement.

3. Even though male and female gametes differ in size and morphology, they have the same number of chromosomes, suggesting equal genetic contributions from each parent.

4. The gametic chromosomes combine during fertilization to produce offspring with the same chromosome number as their parents.



23 Question: What are Holandric genes? Describe with suitable examples.

Answer: Holandric genes

Holandric genes are genes located on the Y chromosome. They are found only in males. They are transmitted from father to son. Daughters do not inherit holandric genes because they do not receive a Y chromosome from their father.

Examples:

SRY Gene: The Sex-Determining Region Y gene triggers male biological development and testes formation.

Hypertrichosis Pinnae Auris: A trait causing excessive hair growth on the outer ear, historically used example of Y-linked inheritance.

Spermatogenesis Factors: Genes on the Y chromosome (such as the AZF region) that are essential for normal sperm production and male fertility.

24 Question: What is Cytoplasmic Inheritance give example.

Answer: Cytoplasmic Inheritance

Cytoplasmic inheritance, also called extranuclear inheritance or maternal inheritance, refers to the transmission of genetic information through the cytoplasm rather than the nucleus.

It involves genes located outside the nucleus,

Key features

1. Source of genetic material: It involves genes found in organelles like mitochondria and chloroplasts, not the nucleus.

2. Inheritance pattern: It is often maternal, with the cytoplasm of the egg cell (not the sperm) providing the organelle DNA to the offspring.

3. Non-Mendelian inheritance: It does not follow the rules of Mendelian genetics where offspring inherit half their nuclear genes from each parent.

4 Reciprocal crosses: The results of reciprocal crosses are not the same, which is a key indicator of cytoplasmic inheritance.

5. Self-replication and mutation: Plasmagenes, the genes in the cytoplasm

Examples

1. Shell coiling in snails: The direction of shell coiling (dextral or sinistral) is determined by the mother's genotype, not the individual snail's own genes

2. Paramecium killer trait: The ability of Paramecium to kill other strains is due to cytoplasmic "kappa" particles, which are passed from mother to offspring.

25 Question: What is cell Adhesion? Describe various types of cell adhesion molecules.

Answer: Cell Adhesion

Cell adhesion is the process by which cells bind to each other or to the extracellular matrix using surface proteins called cell adhesion molecules (CAMs).

Cell Adhesion Molecules (CAMs)

Cadherins: Calcium-dependent glycoproteins that mediate cell-cell adhesion. and form adherens junctions and desmosomes.

Integrins: Trans membrane heterodimer receptors (alpha and beta subunits) that attach cells to the extracellular matrix and facilitate cell signaling.

Selectins: Integral membrane glycoproteins that bind to sugar molecules on other cells, playing a key role in inflammation and leukocyte rolling.

Immunoglobulin Superfamily (IgSF): Calcium-independent transmembrane proteins involved in cell recognition, binding, and immune responses.

Functions:

1. Prevent paracellular movement of water, ions, and solutes.
2. Maintain cell polarity by separating apical and basal lateral membrane domains.
3. Act as a selective permeability barrier.
4. Protect underlying tissues from harmful substances and pathogens.

26 Question: What are Chromosomal anomalies?

Answer: Chromosomal anomalies

Chromosomal abnormalities are missing, extra, or irregular pieces of chromosomal DNA that happen during cell division.

Types of Abnormalities

Numerical abnormalities: Having too many or too few whole chromosomes, such as aneuploidy where a cell has an extra chromosome (trisomy) or a missing chromosome (monosomy).

Structural abnormalities: Changes where parts of an individual chromosome are broken, inverted, duplicated, or moved to another chromosome (translocation).

Examples

Down syndrome (Trisomy 21): An extra copy of chromosome 21 causing developmental and physical delays.

Turner syndrome (Monosomy X): Missing an X chromosome in biological females.

Klinefelter syndrome (XXY): An extra X chromosome in biological males.

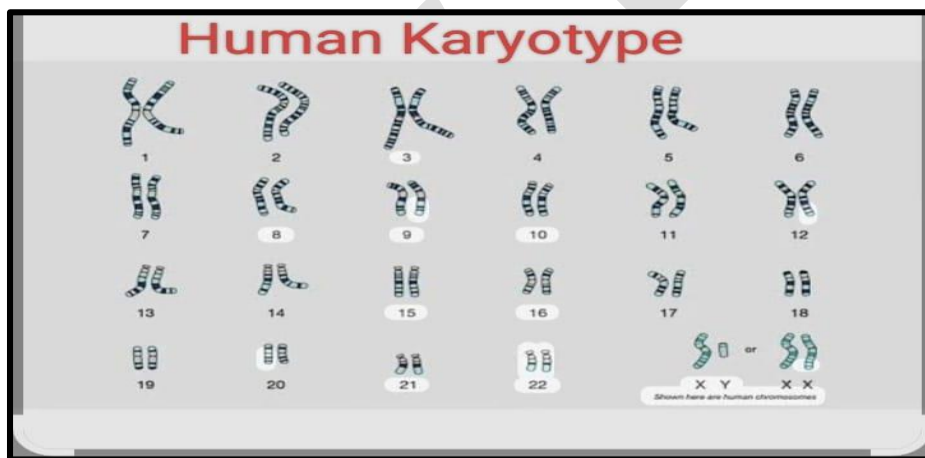
27 Question: Write short note on Karyotype.

Answer: KARYOTYPE

A karyotype is an individual's complete set of chromosomes. The process of preparation of the karyotype of a species is called Karyotyping. A karyogram or idiogram is a graphical depiction of a karyotype.

These characteristics which are described by a karyotype are: -

- (1). The chromosome numbers
- (2). Relative size of different chromosomes
- (3). Position of centromere and length of chromosomal arms



- (4). Presence of secondary constrictions and satellites
- (5). Banding pattern of the chromosome

28 Question: Write short note on Pedigree analysis.

Answer: Pedigree analysis

Pedigree analysis uses a family tree chart and standard symbols to track the inheritance of a specific trait or genetic disorder through generations. It is a tool used in genetics to study how genes are passed from parents to offspring.

Pedigree Symbols -

Squares (□): Represent males. **Circles (○):** Represent females.

Shaded symbols: Indicate individuals affected by the trait or disorder.

Horizontal bar: Connects two individuals who have mated, representing a marriage or mating.

Vertical line: Connects parents to their offspring, indicating the siblings.

Generations: Denoted by Roman numerals (I, II, III, etc.) on the left side of the chart.

Offspring: Numbered from left to right within their generation.

Purpose of Pedigree Analysis-

1. Determine mode of inheritance
2. Genetic counseling
3. Understand disease
4. Predict risk

29 Question: What is Gene penetrance? Explain with example.

Answer: Gene penetrance

Genes express themselves by producing visible phenotypic effect. Generally, the structural gene express themselves in all the individuals that carry them. The ability of gene express itself in an individual that is carrying it is called penetrance. On the basis penetrance can be of two types-

1. Complete Penetrance

In complete penetrance a dominant gene expresses itself in all the organisms in which it is present producing the expected phenotype while the recessive gene produces the associated phenotype in all those organisms in which it is present in homozygous condition.

Examples

1. In pea plants the red and white flower colour, tall and dwarf character, the seed colour and shape all exhibit complete penetrance.
2. In Drosophila, the recessive gene for wing character (vestigial wings) has complete penetrance.

2. Incomplete Penetrance

Some genes whether in homozygous or heterozygous condition fail to produce the phenotypic expression in all the organisms in which these are present, i. e, these fail to produce cent-percent expression.

Example.

1. In man, genes for polydactyl, blue sclerotic and diabetes mellitus all exhibit incomplete penetrance.
- 2 A gene in Lima beans causing partial chlorophyll deficiency in cotyledons leaves has 10 %penetrance.

30 Question: What is barr body? Discuss the relationship between the barr body and ex chromosome.

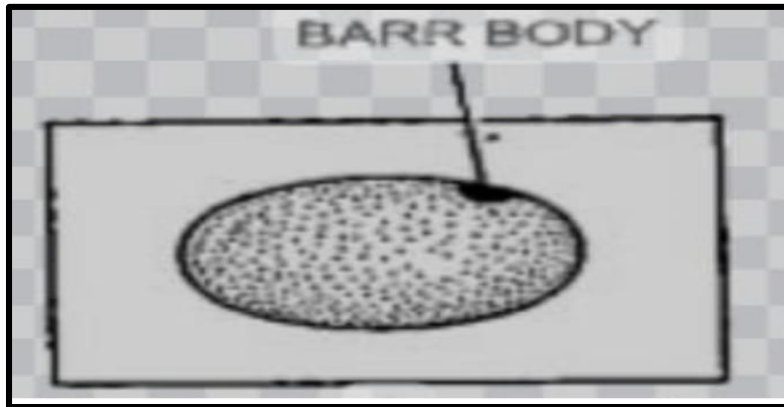
Answer: Barr body

A Barr body is the inactive X chromosome present in the nucleus of a somatic cell of mammalian females. It appears as a small, dark-staining mass of chromatin, usually near the nuclear membrane.

Relationship between Barr body and X chromosome

1. In female mammals, there are normally two X chromosomes (XX).
2. Early in embryonic development, one X chromosome becomes inactivated in each somatic cell. This is called X-chromosome inactivation (lyonization).
3. The inactivated X chromosome becomes highly condensed and forms a Barr body.

Number of Barr bodies = Number of X chromosomes – 1



31 Question: Give an account of the chromosomal basis of sex determination.

Answer: Sex determination.

There are two different types of sexes that participate in sexual reproduction. So it is natural to find it confounding as from which sex the baby inherits, that results in the sex of the child. There are several other procedures followed to determine the sex of a newborn baby. Based on the environmental signals the sex of a baby can be determined. In a few animal species, temperature plays a major role in sex determination. In other animals, like snails, it is possible to change sex as they are not genetically processed. In human beings, the sex of an individual is genetically determined. In other words, the genes which are inherited from their parents decide the sex of the child. To understand how the determination of sex happens, we need to

1. Humans have 23 pairs of chromosomes. Out of these 23 pairs, 22 pairs are Autosomes and know the following process.

only one pair is the 'Sex Chromosome', which actively takes part in the process of sex determination.

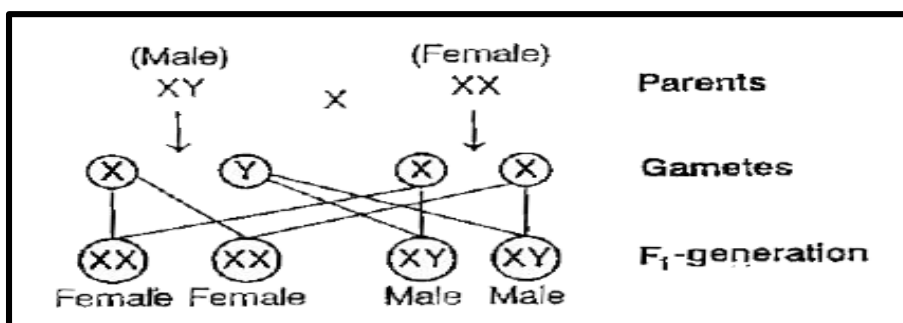
2. Both males and females carry two sets of sex chromosome.

3. Male has one X and one Y (XY) sex chromosome in which both are active

4. Female has both X (XX) sex chromosome in which one is active.

5. The XY sex-determination system is found in humans, mammals, in some insects, and in few plant species.

6. All children will inherit an X chromosome from their mother, despite whether they are a boy or girl. Thus, the sex of the children will be determined by the type of chromosome inherited from their father.



7. A child who inherits Y chromosome will be a boy and who inherits X chromosome will be girl.

32 Question: Write short note on colour blindness.

Answer: Colour blindness -Colour blindness defined as trouble in seeing or and identifying colours like blue, green and red. There are some rare cases where a person cannot see and identify any colours at all. Colour blindness was discovered by an English chemist named John Dalton in the year **1798**.

Causes

Inherited (Congenital): Passed down from biological parents through genetics. Red-green deficiency is typically an X-linked recessive trait, making it much more common in males.

Acquired: Can develop later in life due to aging, eye diseases , chronic health conditions , certain medications, or chemical exposures.

Symptoms

1. Rapid eye movement.
2. Sensitivity towards the bright light.
3. Trouble in seeing colours and the
4. Brightness of colours.
5. The problem in identifying the differences between colours shades.

Treatment: There is no permanent cure for inherited color blindness. However, special color-corrective glasses, filters, or contact lenses can help enhance contrast and clarity for some individuals.

33 Question: Write short note on haemophilia.

Answer: Haemophilia

Haemophilia is a rare, inherited bleeding disorder that prevents blood from clotting normally due to a deficiency in specific clotting proteins. This can lead to spontaneous bleeding as well as bleeding following injuries .Blood contains many proteins called clotting factors that can help to stop bleeding. People with hemophilia A or B have low levels of either factor VIII (8) or factor IX (9).

Types

Hemophilia A: Caused by a deficiency of clotting factor VIII (Factor 8).

Hemophilia B (Christmas Disease): Caused by a deficiency of clotting factor IX (Factor 9).

Acquired Hemophilia: A rare, non-inherited autoimmune variant where the immune system attacks clotting factors.

Symptoms

Haemarthrosis: Painful, spontaneous bleeding into joints leading to swelling and potential damage.

Hematomas: Large and deep muscle bruises or soft tissue bleeding.

Prolonged Bleeding: Excessive bleeding from minor cuts, dental procedures, or nosebleeds.

Treatment

Factor Replacement Therapy: Intravenous infusion of the missing clotting factor (VIII or IX) to stop or prevent bleeding.

Non-Factor Therapies: Specialized medications and injections to improve coagulation function.

Precautions: Avoiding contact sports and medications that inhibit clotting (like aspirin).

34 Question: Write short note on Signal transduction.

Answer: Signal transduction

Signal transduction is the biological process where an external chemical or physical signal converts into a specific intracellular response. The most common signal transduction process is protein phosphorylation, where proteins are catalyzed by enzymes known as protein kinases.

Stages

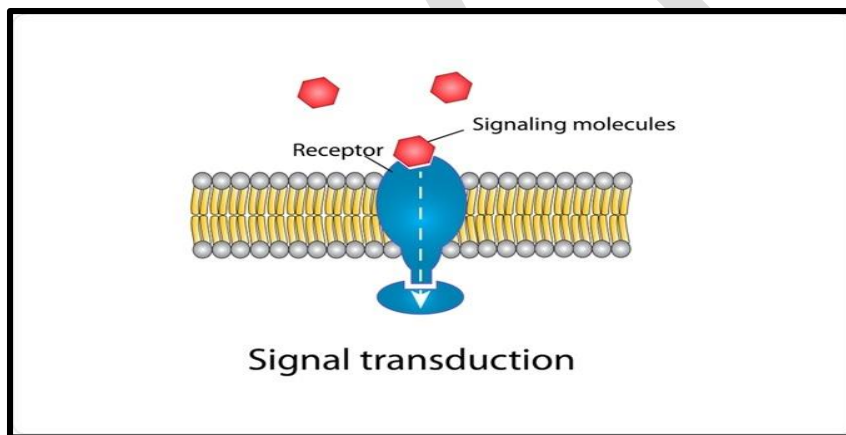
1. **Reception:** A signaling molecule (ligand) binds to a specific protein receptor on the cell surface or inside the cell.
2. **Transduction:** The receptor changes shape, starting a relay chain of molecular events or biochemical cascades.
3. **Response:** The final signal triggers cellular actions like growth, gene expression changes, or cell division.

Components

Receptors: Proteins that detect signals, such as G protein-coupled receptors (GPCRs) or ligand-gated ion channels.

Kinases: Enzymes that add phosphate groups to proteins to activate them in a phosphorylation cascade.

Second messengers: Small molecules like cyclic AMP (cAMP) that rapidly amplify and spread the signal inside the cell.



35 Question: Write short note on JAK-STAT pathway.

Answer: JAK-STAT Pathway

JAK-STAT (Janus Kinase-Signal Transducer and Activator of Transcription) pathway is a fast cellular signaling chain that transmits chemical signals from outside the cell membrane directly to the nucleus to turn on specific genes.

Steps:

Ligand binding: Cytokine/growth factor binds to its specific cell-surface receptor.

JAK activation: Receptor-associated JAKs become activated and phosphorylate each other.

Receptor phosphorylation: Activated JAKs phosphorylate tyrosine residues on the receptor.

STAT recruitment: STAT proteins bind to these phosphorylated sites.

STAT phosphorylation: JAK phosphorylates STAT.

Dimerization: Phosphorylated STATs form dimers.

Nuclear entry: STAT dimers enter the nucleus.

Gene activation: STAT binds to specific DNA sequences and regulates target gene transcription.

Functions:

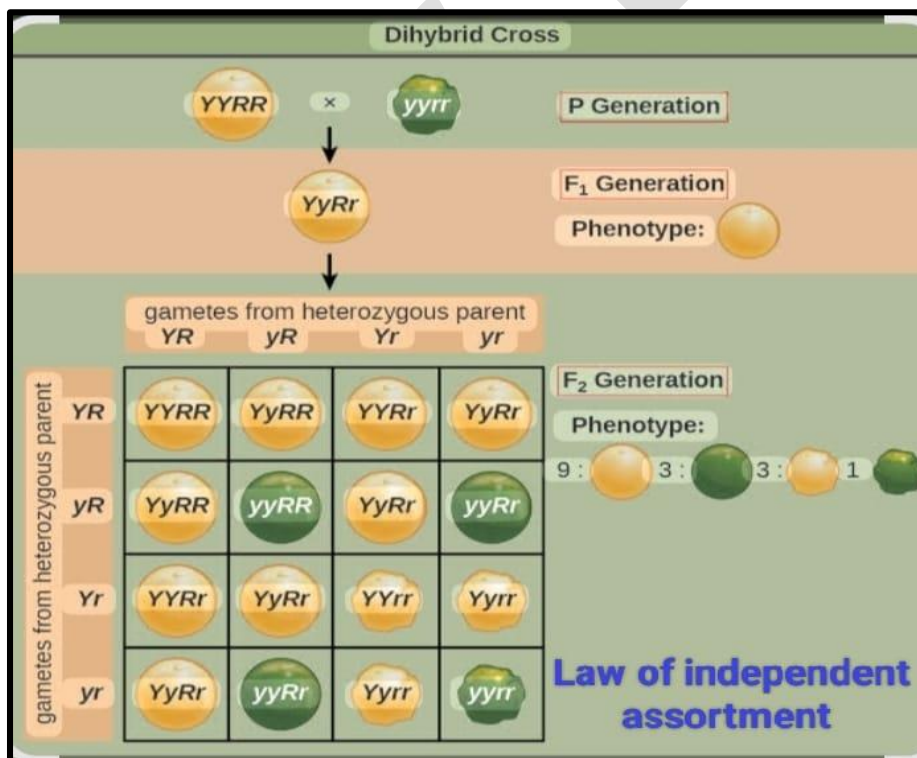
1. Cell growth and differentiation
2. Immune and inflammatory responses
3. Haematopoiesis
4. Cell survival
5. Response to cytokines and hormones

36 Question: Write short notes on Mendel's Law of Independent Assortment?

Answer: Law of Independent Assortment

Mendel's law of independent assortment states that the alleles of two different genes get sorted into gametes independently of one another. In other words, the allele a gamete receives for one gene does not influence the allele received for another gene.

Example-when a yellow round seed bearing pea plant is crossed with a green wrinkled seed bearing pea plant, 9 pea plants bearing yellow round seeds, 3 pea plants bearing yellow wrinkled seeds, 3 pea plants bearing green round seeds and 1 pea plant bearing green wrinkled seeds produced in f1 generation.



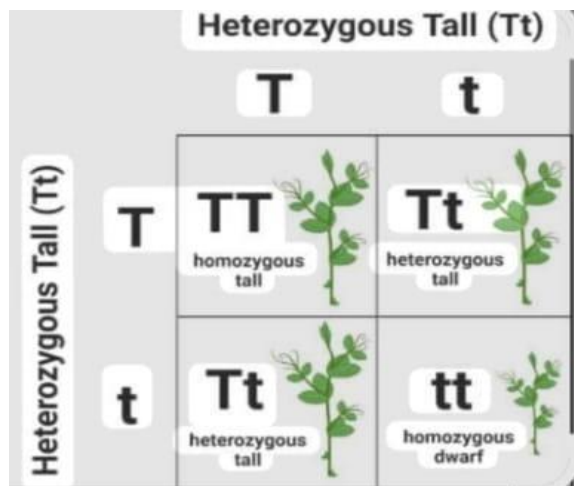
37 Question: Write short notes on Mendel's Law of Dominance.

Answer: Mendel's Law of Dominance

'In crossing between homozygous organisms for contrasting characters of a pair, only one character of the pair appears in the first generation.'

The law of dominance is the first law of heredity proposed from the works of Mendel. The law explains that all characters in an individual are controlled by distinct units called factors that occur in pairs.

- The pair can be homozygous or heterozygous, and in the case of heterozygous pairs, one of the factors dominates the other.
- The character that dominates is called the dominant character, and the one that remains unexpressed is the recessive character.
- The recessive character, even though latent, is transmitted to the offspring in the same way as the dominant character.
- The recessive character is only expressed when the offspring has two copies of the same allele resulting in a homozygous individual.
- The two alleles responsible for a character are brought together during fertilization, where one of the alleles comes from the maternal gamete and the other from the parental gamete.
- The concept of dominance is strictly only used for genotypic characters and does not represent the phenotype of the individual.
- With new experiments on genetics, many researchers believe that the law of dominance doesn't always hold true and that other patterns of inheritance also exist.



38 Question: Difference between Test cross and Back cross and their significance.

Answer:

DIFFERENCE BETWEEN TEST CROSS AND BACK CROSS

Test Cross

- The test cross is the cross that occurs between a dominant phenotype and a recessive phenotype.
- Test cross is the breeding of dominant phenotype with its recessive phenotype.
- All test crosses are back crosses

Back Cross

- The backcross is the cross that occurs between generation F1 hybrid and one of the two parents.
- Backcross is the breeding of F1 hybrid with one of the parents.
- Backcross of the F1 hybrid with recessive phenotype can be considered as the test cross

Significance:

1. Determines whether the dominant individual is homozygous or heterozygous.
2. Helps determine the genotype of an organism.
3. Used to verify Mendelian inheritance.
4. Helps calculate the gamete types produced by an individual.

39 Question: Differentiate between euploidy and aneuploidy chromosomal aberrations.

Answer: Difference between euploidy and aneuploidy

Euploidy	Aneuploidy
The condition of having a chromosome number that is an exact multiple of another chromosome number is known as euploidy.	A condition in which one or more chromosomes are added or removed from the usual number of chromosomes is known as aneuploidy.
A major variation in which chromosomal sets increase the amount of genetic material.	The amount of genetic material varies with the number of chromosomes, which is a relatively minor fluctuation.
The variations are diploid (2n), triploid (3n), and tetraploid (4n).	Variations include nullisomy, monosomy, trisomy, and tetrasomy.
It is more common in plants than in animals.	It can be found in both animals and plants.
Cause complete non-disjunction and interspecies crosses.	Cause meiotic non-disjunction, mitotic non-disjunction, and chromosome loss.
May lead to the formation of new species.	Leads to imbalance in the number of gene products.

40 Question: Differentiate between incomplete and co-dominance.

Answer: Difference between incomplete and co-dominance

Co-dominance	Incomplete Dominance
1) When a cross is made between individuals with two different phenotypes, co-dominance is the emergence of both parental traits in the progeny.	When a cross is made between individuals with two different phenotypes, a third phenotype appears which is a combination of both parental alleles.
2) Both alleles have an equal impact on the outcome.	One of the two parental alleles has a more noticeable influence.
3) The two parental phenotypes are combined to create a third phenotype.	There is no mixing of the two parental alleles.
4) The effects of both parental alleles are independent.	On the offspring, the two parental alleles have a mixed effect.
5) In the offspring, both parental alleles can be seen.	In the offspring, neither parental alleles can be found.
6) An approach to gene expression that is qualitative.	Both incompletely dominant alleles were studied quantitatively.
7) Examples include the roan pattern of cows and the AB blood group inheritance.	Pink snapdragon is an example, as is the inheritance of height, weight, and eye colour.

41 Question: Differentiate homozygous and heterozygous.

Answer: Difference between homozygous and heterozygous

	Homozygous	Heterozygous
1	It has two same copies of the same allele coding for a particular trait.	It contains two different copies of alleles coding for a particular trait.
2	Contains only one type of allele, either dominant or recessive	Contains different alleles for a trait. Both dominant and recessive
3	Self-fertilization results in the repetition of the same traits over generations	Self-fertilization results in different combination of traits over the next generations
4	Only one type of gamete is produced	Two types of gametes are produced
5	It can be either homozygous dominant or homozygous recessive	Heterozygous alleles can show complete dominance, codominance or incomplete dominance

42 Question: Differentiate between Co-dominance and Incomplete dominance.

Answer: Difference between Co-dominance and Incomplete dominance.

Co-dominance	Incomplete Dominance
1) When a cross is made between individuals with two different phenotypes, co-dominance is the emergence of both parental traits in the progeny.	When a cross is made between individuals with two different phenotypes, a third phenotype appears which is a combination of both parental alleles.
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7) Examples include the roan pattern of cows and the AB blood group inheritance.	Pink snapdragon is an example, as is the inheritance of height, weight, and eye colour.

43 Question: Briefly discuss about Multiple Alleles.

Answer: Multiple Alleles

Multiple alleles are three or more alternative alleles of the same gene present at the same locus in a population. However, an individual can possess only two alleles at a time, one inherited from each parent.

Example:

1) Eye colour in *Drosophila*: The normal colour of the eye is red. This red colour of the eye is changed to white due to mutation. Other mutations occurred at white locus that are expressed and occur due to multiple alleles, which changes the red eye colour to various lighter shades such as cherry, apricot, eosin, creamy, ivory, blood etc.

2) ABO blood group in humans: The ABO blood group is controlled by three alleles:

I^A – produces A antigen

I^B – produces B antigen

i – produces no antigen

Their relationships are:

$I^A I^A$ or $I^A i$ → Blood group A

$I^B I^B$ or $I^B i$ → Blood group B

$I^A I^B$ → Blood group AB (I^A and I^B are codominant)

44 Question: Write short note on Gregor Johan Mendel.**Answer: Gregor Johan Mendel (1822-1884)**

Gregor Johan Mendel, an Austrian monk, and abbot of the Augustinian Monastery at Briunn, Austria, is pioneer in the field of Heredity. Painstakingly for years he carried experiments on inheritance of characters with pure races of garden peas and from the results he deduced certain fundamental laws of heredity. These are known as 'Law of dominance', Law of segregation' and 'Law of independent assortment'. His findings were published in 1886 in an obscure journal and were made known to the world only in 1900, sixteen years after his death by three scientists Correns de Vries and Tschermak who had independently reached the same conclusion.

The discovery of Mendel's work gave tremendous impetus to the study of heredity and many new fields have been explored. Genetics, from a humble beginning in the hands of Mendel. Father of Genetics, has risen to a tremendous height and it has helped us to understand many of the problems of inheritance, and explain the complicated process of organic evolution.

45 Question: Describe the structure and life cycle of filaria parasite.**Answer: Wuchereria bancrofti**

Pyhlum - Nematelminthes

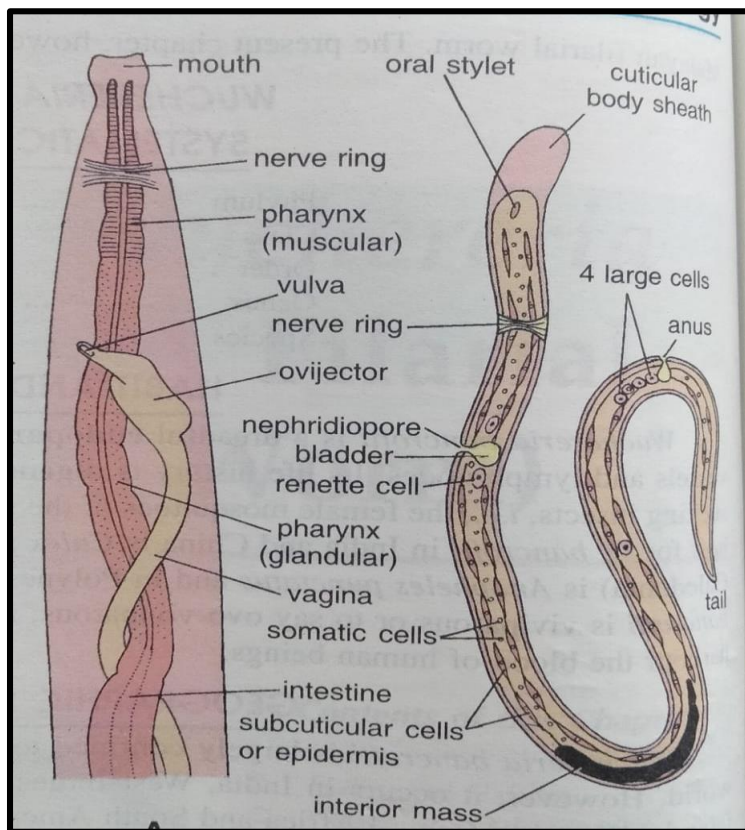
Class - Nematoda

Onder - Filarioidea

Genus- *Wuchereria*

Species- *bancrofti*

It is commonly known as 'Filarial worm' found in the lymphatic vessels, muscular tissues and glands of man. The female is about 8 cm in length. The body is creamy-white, cylindrical and filiform with blunt ending on the anterior and posterior sides. The posterior end of the male is curved. . The intermediate host is a mosquito (*Culex fatigans*).



Life cycle

The female after fertilization does not lay eggs directly but eggs are retained in the female. The female gives birth to a (microfilariae) which are surrounded by a delicate membranous number of larvae sheath. These microfilariae live in the lymph vessels or migrate into the blood capillaries under the skin. Microfilariae appear in the skin capillaries during night between 10 P.M. to 2 AM. and during day time they live in large deep seated blood vessels. If the secondary host bites the man, containing microfilariae, in between 10 P.M. to 2 AM the larvae enter into the mosquito's stomach from where they migrate to the thoracic muscles where they grow and attain length of about 1.5 mm in a few weeks. Now, the larvae migrate to the proboscis of intermediate host. In this stage if the mosquito bites a man the larvae are transferred to the blood stream of man from where they go to the lymph glands and lymph passages, and grow into mature stage.

Disease. In the severe infection due to repeated inoculation the adults cause blocking of lymphatic system which results in the enlargement of legs, arms, scrotum and mammary glands which is known as elephantiasis. It causes filarial fever and headache.

Prevention and control

The most effective preventive means is to avoid the mosquito bite. Mosquito breeding should also be controlled by all means. No proper drug has been invented to eradicate the filaria worms. A drug called heterazon and cyanine is effective to a certain extent.

46 Question: Give an account of pathogenicity of *Giardia*.

Answer: *Giardia lamblia intestinalis*

Phylum- Protozoa

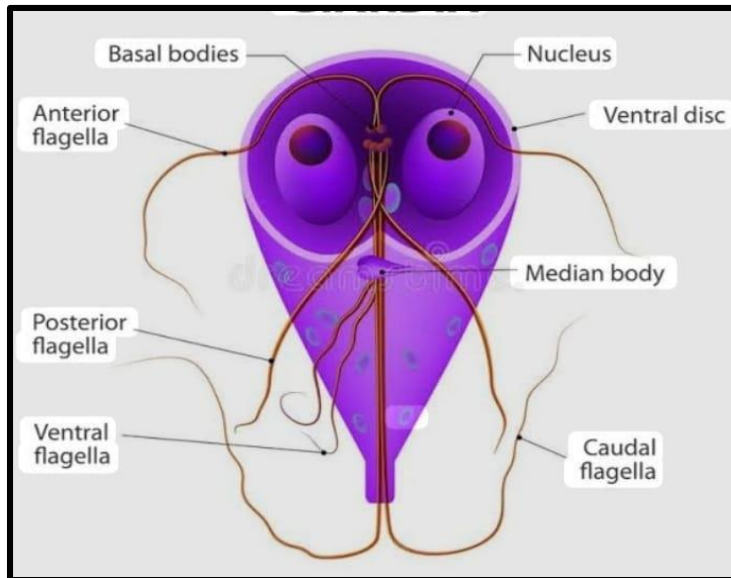
Class- Zoomastigina

Order - Protomonadina

Genus- Giardia

Species- lamblia

Sub-species- intestinalis



Giardia is commonly known as grand old man of the intestine. It is an endoparasite and reproduce in a small intestine of human beings and other vertebrates such as cats, dogs and cattle etc. Giardiasis is an intestinal infection caused by the flagellated protozoan parasite (*Giardia duodenalis*, *Giardia lamblia* or *Giardia intestinalis*).

Symptoms

1. Watery, foul-smelling, and greasy diarrhoea.
2. Severe abdominal cramps, bloating, and flatulence
3. Nausea and weight loss.

Prevention

1. Wash hands frequently with soap and water.
2. Avoid drinking untreated water.
3. Rinse all raw fruits and vegetables with clean water before eating them.

Medications

1. Metronidazole
2. Tinidazole
3. Nitazoxanide

Supportive-Drink plenty of water and clear fluids to replace lost electrolytes and prevent dangerous dehydration from diarrhea.

47 Question: What is AIDS? Describe structure and pathogenesis.

Answer: AIDS

AIDS stands for acquired immunodeficiency syndrome. AIDS is the most advanced stage of HIV infection. It's a life-threatening disease that occurs when HIV has weakened the immune system, making it harder to fight off infections and cancers.

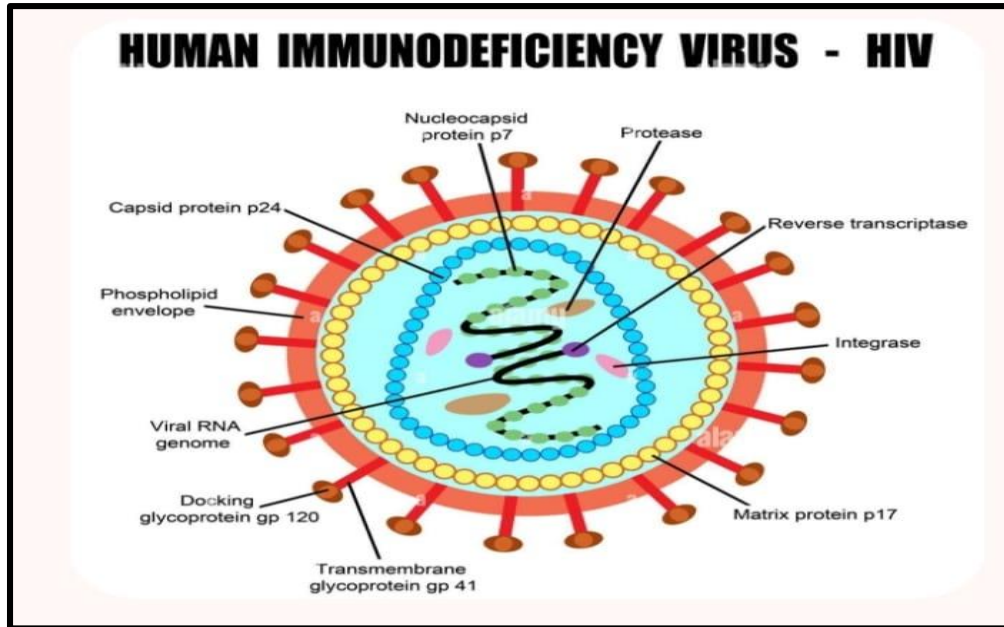
Symptoms of AIDS

1. Fever
2. Headache
3. Muscle aches and joint pain, Rash
4. Sore throat and painful mouth sores
5. Swollen lymph glands
6. Weight loss
7. Cough
8. Night sweats

How is HIV spread?

HIV is spread through the body fluids of an infected person, including:

1. Blood
2. Breast milk
3. Semen
4. Vaginal fluids



How is HIV prevented?

To reduce your risk of getting HIV, you can:

1. Use condoms correctly every time you have sex
2. Do not inject drugs
3. If you do inject drugs, use only sterile injection equipment and water
4. Never share your injection equipment with other .

How is HIV treated?

Antiretroviral therapy (ART) is a combination of HIV medicines that can:

1. Reduce the level of HIV in the blood (viral load).
2. Eliminate the risk of HIV transmission.
3. Help people with HIV have about the same life expectancy as people without HIV.

48 Question: Write short note on filariasis (Elephantiasis).

Answer: filariasis

Filariasis is a parasitic disease transmitted by black flies and mosquitoes. These parasites are thin, round, worm-like organisms. They appear white or translucent when observed under a microscope. It is mainly caused by *Wuchereria bancrofti*. The life span of filariae would be around 5 to 7 years. During their lifespan, they produce millions of larvae. The size of the female is between 250 and 300 μm long and the size of the males is roughly half as long as the females. Two basic actions can protect you from typhoid fever. Avoid dirty or contaminated foods and drinks.

49 Question: Write short note on Tuberculosis.

Answer: Tuberculosis

Tuberculosis (TB) is a contagious disease. Like the common cold, it spreads through the air. Only people who are sick with TB in their lungs are infectious. Left untreated each person with active TB disease is infected on average between 10 and 15 people every year.

Cause and Transmission

When infectious people cough, sneeze, talk or spit, they propel TB germs, known as bacilli into the air. A person needs only to inhale a small number of these to be infected.

Symptoms

TB bacteria usually grow in the lungs. TB in the lungs may cause:

1. A bad cough that lasts longer than 2 weeks
2. Pain in the chest
3. Coughing up blood or sputum (phlegm from deep inside the lungs).
4. Weakness or fatigue
5. Weight loss
6. Loss of appetite
7. Chills
8. Fever
9. Sweating at night

Prevention

*Once patients with infectious TB (bacilli visible in a sputum smear) have been identified using microscopy.

*health and trained workers observe patients swallowing the full course of the correct dosage of anti-TB drugs. The most common anti-TB drugs are isoniazid, rifampicin, pyrazinamide, streptomycin and ethambutol.

Since its introduction in 1991, more than 13 million patients have received treatment under the DOTS strategy. The World Bank has ranked the DOTS strategy as one of the "most cost-effective of all health interventions".

50 Question: Write short note on Trypanosomiasis (Sleeping sickness).

Answer: Trypanosomiasis (Sleeping sickness)

Trypanosomiasis is a vector-borne parasitic disease caused by protozoan parasites of the genus *Trypanosoma* and transmitted through the bites of infected Tse-tse fly (*Glossina palpalis*)

Symptoms

1. Fever and headache
2. Weakness and fatigue
3. Swollen lymph nodes
4. Joint and muscle pain
5. Disturbed sleep pattern

Treatment

Antiparasitic drugs like pentamidine, suramin, or fexinidazole for early stages, and melarsoprol or eflornithine if the central nervous system is involved.

Prevention

Vector control, insect repellent, and protective clothing in endemic zones.

51 Question: Write a short note on Aspergillosis

Answer: Aspergillosis

-Allergic Bronchopulmonary Aspergillosis (ABPA):

Symptoms

1. Wheezing, cough, shortness of breath Fever (mild)
2. Brownish mucus plugs
- 3 .Often seen in asthmatics and cystic fibrosis patients

Invasive Aspergillosis :

1. Fever not responding to antibiotics
2. Chest pain, breathlessness
3. Cough with blood

Cutaneous Aspergillosis:

1. Skin lesions, necrotic ulcers
- 2 .Can direct inoculation or dissemination)

Control and Preventive Measures:

- 1 Avoid exposure to dust, moldy environments.
- 2 Use protective masks (N95) for immunocompromised individuals.
- 3 Proper hospital air filtration (HEPA filters).
- 4 Avoid gardening/soil contact in high-risk patients.

Medical Treatment

Antifungal drugs:

Voriconazole , Amphotericin B , Itraconazole & Corticosteroids

52 Question: Write a short note on Candidiasis

Answer: Candidiasis

A fungal infection caused mainly by Candida albicans,

Types & Symptoms- Oropharyngeal Candidiasis (Thrush) 1. White, creamy patches in mouth, tongue, throat, Redness, soreness, difficulty swallowing and cracks at mouth corners.

Vaginal Candidiasis (Vulvovaginal Candidiasis):

Itching, burning sensation Thick, white, “cottage-cheese” discharge Redness and swelling of vulva.

Cutaneous Candidiasis:

Red, itchy rash in moist skin folds.

Invasive/Systemic Candidiasis:

Fever, chills not responding to antibiotics can affect blood, heart, kidneys, eyes, brain seen in ICU patients.

Control and Preventive Measures:

Maintain good hygiene, keep skin folds dry, Avoid tight clothing & prolonged moisture

Limit unnecessary antibiotic use Good oral care.

*Fluconazole (commonly used systemic drug)

*Amphotericin B, Echinocandins (for resistant or systemic infections)

53 Question: Explain Covid-19 or Coronavirus Disease.

Answer: Covid-19 or Coronavirus Disease

Covid-19 is an infectious disease caused by coronavirus. Corona virus is RNA virus, in which positive-stranded RNA molecule is enveloped in a protein coat. Each viral particle is called nucleus-capsid. Its surface is covered with spokes formed of glycoproteins.

Symptoms:

People infected with COVID-19 virus experience mild to moderate respiratory illness. .The most common symptoms of COVID-19 infection are:

- | | | | |
|---------------|---------------------------|----------------------------|------------|
| 1. Dry cough. | 2. Sore throat | 3.Loss of taste or smell. | 4. Fever |
| 5.Tiredness. | 6. Body ache | 7. Difficulty in breathing | 8. Loss of |
| speech | 9.chest pain of pressure. | 10. Diarrhoea | |

Infection:

COVID-19 virus spreads through droplets of saliva or discharge from nose when an infected person coughs or sneezes.

Preventives measures:

The best way to prevent and slow down transmission is to protect yourself and others from infection by:

1. Washing your hands frequently with soap and water at least for 20 seconds every time.
2. Wear a mask or cover face with clean cloth.
3. Avoid touching face, eyes, nose and mouth.
4. Maintain social distancing work from home if possible and avoid large gathering and public places.
5. Avoid unnecessary travel and use of public transport.
6. Educate people to replace the spread of infection.
7. Get vaccinated with COVID-19
8. If diagnosed with COVID-19, stay isolated in a separate room, away from others and help your room will ventilated.