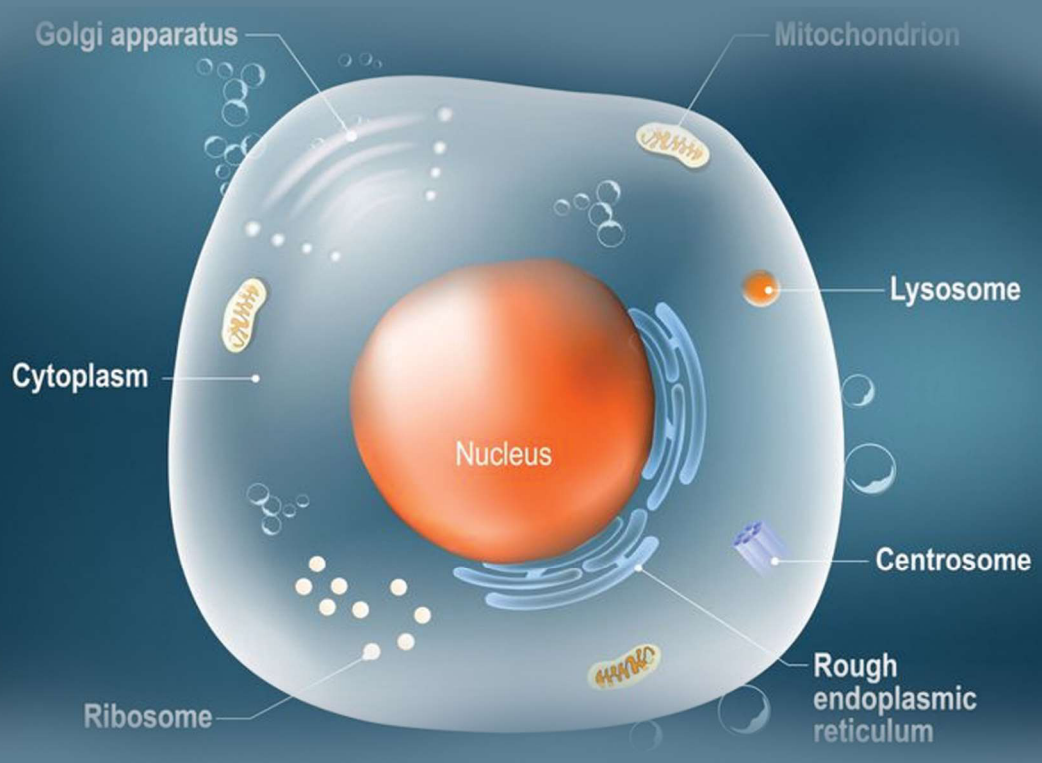
Class-10

BIOLOGY



GENERAL EDUCATION DEPARTMENT
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CONTENT

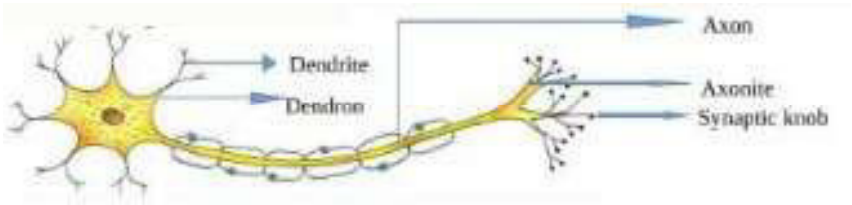
CHAPTER 1

SENSATION AND RESPONSES

Focus area

1. **Neuron- Diagram, functions of dendrite, dendron, axon, axonite and synaptic knob.**
2. **Different types of nerves – Sensory nerve, motor nerve and mixed nerve. characteristics and function.**
3. **Brain- Diagram, functions of cerebrum, cerebellum, medulla oblongata, thalamus and hypothalamus.**
4. **Diseases affecting the nervous system – Alzheimer's, Parkinsons and Epilepsy their causes and symptoms.**

1. Neuron- Diagram, functions of dendrite, dendron, axon, axonite and synaptic knob.



Important parts	Functions
Dendrite	Branches of dendron. Part that receives impulses from the adjacent neuron
Dendron	Carries impulses from dendrites to the cell body
Axon	Longest filament from the cell body. Carries impulses to the axonite.
Axonite	Branches of axon. Carries impulses to the synaptic knob
Synaptic knob	Tip of axonite, secretes neurotransmitter

Sample questions

- 1. Draw the diagram of neuron and label the parts according to the hints given.

  (For drawing the diagram 1 score, for identifying and labelling 1 score each)

  Hint : Part which secretes neurotransmitter- synaptic knob

  • Carries impulses away from the cell body- axon

  • Carries impulses to the synaptic knob-axonite

  • Receives impulses from adjacent neuron

II. Different types of nerves – Characteristics and functions of sensory nerve, motor nerve and mixed nerve.

Characteristics of nerves

- Sensory nerves :Formed of sensory nerve fibres
- Motor nerves: Formed of motor nerve fibres
- Mixed nerves : Formed of sensory nerve fibres and motor nerve fibres

Type of nerves and their functions

Different parts of the Body	Sensory nerve →	Brain and spinal cord
Different parts of the body	← Motor nerve	Brain and spinal cord
Different parts of the Body	Mixed nerve ⇄	Brain and spinal cord

Sample questions

1) Make suitable pairs – Nerves and their functions

Understand cleary nerves and their functions. Names of nerves are given in bold letters. Make pairs of each of them with their corresponding function

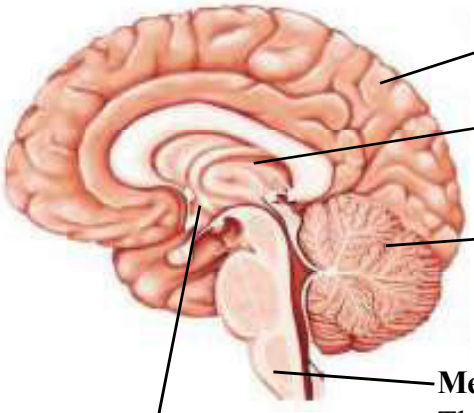
Sensory nerve carries impulses from brain and spinal cord to various parts of the body, **Motor nerve** carries impulses from various parts of the body to brain and spinal cord. Carries impulses to and from the brain and spinal cord **Mixed nerve**

2) Complete the following by understanding the word pair relationship.

Motor nerve: Impulses from brain and spinal cord to different parts of the body.

Mixed nerve: .....

III.Brain- Diagram, functions of cerebrum, cerebellum, medulla oblongata, thalamus and hypothalamus.



Cerebrum
Largest part of the brain

Thalamus
Seen below the cerebrum

Cerebellum
Second largest part of the brain. Seen behind the cerebrum as two flaps

Medulla Oblongata
The rod shaped part seen below the cerebrum and near the cerebellum.

Hypothalamus
Seen below the thalamus

Parts of the brain and their functions.

Parts of Brain	Functions
Cerebrum	• Centre of thought, intelligence, memory and imaginations. • evokes sensations. • controls voluntary movements.
Cerebellum	• Coordinates muscular actions. • maintains equilibrium of the body.
Thalamus	• Act as relay station of impulses to and from the brain. • Analyses the impulses from various parts of the body and sends the important ones to the cerebrum.
Hypothalamus	• Maintains homeostasis.
Medulla oblongata	• Controls involuntary actions like heart beat, breathing etc.

Sample questions

1. Draw the diagram of brain and label the parts according to the hints given below.

   For drawing the diagram 1 score

   For identiying and labelling 1 score each

   a) Maintains homeostasis-Hypothalamus

   b) Analyses the impulses from various parts of the body and sends the important ones to the cerebrum-Thalamus

   c) Controls voluntary movements- Cerebrum

   d) Controls involuntary actions - Medulla oblongata

   e) Coordinates muscular actions-Cerebellum

2. Make pairs of each part of the **brain** with their corresponding **functions**

   Hint : Hypothalamus : maintains homeostasis

Hypothalamus Controls involuntary actions like heart beat, breathing etc,**Thalamus**, maintains equilibrium of the body, **Medulla oblongata** act as relay station of impulses to and from the brain, **Cerebrum** controls voluntary movements, maintains homeostasis, **Cerebellum**

IV. Alzheimers, Parkinsons, Epilepsy causes and symptoms

Diseases	Causes
Alzheimer's	Accumulation of an insoluble protein in the brain, Neurons get destroyed
Parkinsons	Destruction of ganglions Production of dopamine, a neurotransmitter gets reduced
Epilepsy	Continous and irregular flow of electric charges in the brain.

Symptoms

Diseases	Symptoms
Alzheimers	• Loss of memory • Inability to recognize friends and relatives • Inability to do routine works
Parkinsons	• Loss of body balance • Irregular movement of muscles • Shivering , Profuse salivation from the mouth
Epilepsy	• Epilepsy due to the continous contraction of the muscles • Frothy discharge from the mouth • Clenching of the teeth • Falls unconscious

Sample questions

1. Analyse the symptoms of the diseases and answer the questions.

Loss of body balance, irregular movements of the muscles, profuse salivation from the mouth.

Continuous contraction of the muscles, Frothy discharge from the mouth, patient falls unconscious.

a) Identify the diseases

b) Write any one cause of each disease

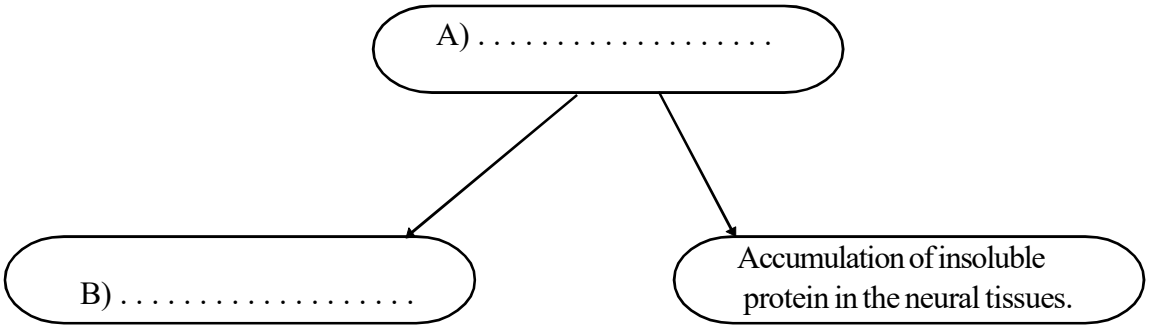
2. An illustration related to the defect of neuron is given below

a) Identify the disease

b) Write the cause of this disease

Hint

A - Disease, B- Cause



3. Tabulate the diseases Alzheimers, Parkinsons and Epilepsy with their causes or symptoms

Production of Dopamine a neurotransmitter reduces, Loss of body balance, clenching of teeth, accumulation of insoluble protein in the neural tissues, inability to recognize friends and relatives

Self Assessment

1. Identify the odd one and write the common features of others.

   Thought, imagination, sight, heart beat

2. Complete the table suitably

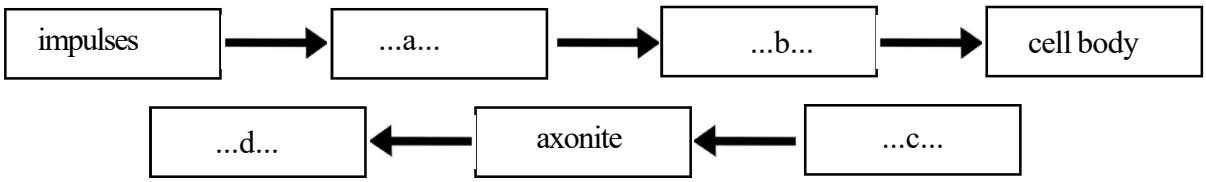
Disease	Symptoms	Causes
..... (a)	..... (b)	An insoluble protein accumulates in the neural tissues of brain
(c)	Frothy discharge from the mouth, Patient falls unconscious.	(d) .....
Parkinsons	(e)	(f) .....

3. Complete the following by identify the word pair relationship.

   Cerebrum : Controls voluntary actions.

   ..... : Controls involuntary actions.

4. Complete the flow chart related to the path of impulses through a neuron.



5. Redraw the diagram and identify and label the parts.

a) Centre of intelligence, thought and imagination.

b) Maintains equilibrium of the body.

c) Controls heartbeat and breathing.

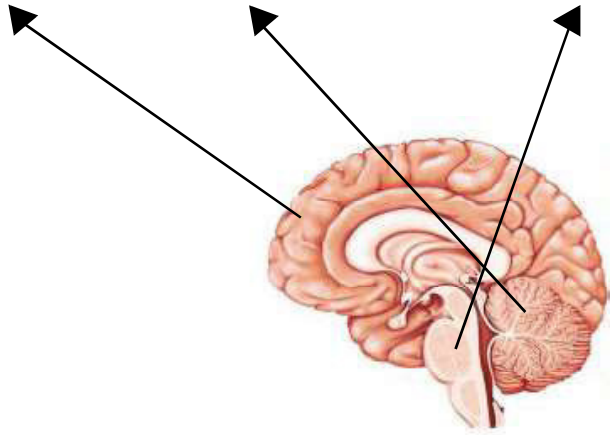
Answer key

1. Heart beat, all other process are controlled by cerebrum.
2. (a) Alzheimers ,

   (b) Loss of memory, inability to do routine works, inability to recognise friends and relatives.

   (c) Epilepsy

   (d) Continuous and irregular flow of electric charges in the brain.
3. Medulla oblongata
4. a. Dendrite, b. Dendron , c. axon , d. Axonite, e. Synaptic knob
5. a. cerebrum, b. Cerebellum, c. Medulla oblongata

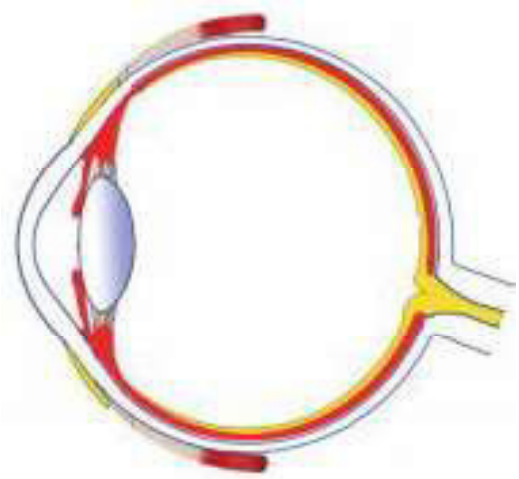


CHAPTER 2
WINDOWS OF KNOWLEDGE

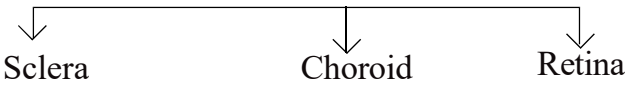
Focus area

- **Eye – image, cornea, iris, pupil, lens, retina, yellow spot, blind spot, optic nerve- characteristics and functions.**
- **Rod and cone cells- pigments and properties.**
- **Flowchart related to the sense of vision.**
- **Night blindness, Xerophthalmia, Colour blindness - causes and symptoms.**
- **The process of taste and smell.**

I. Eye –image, cornea, iris, pupil, lens, retina, yellow spot, blind spot, optic nerve- characteristics and functions.



Eye



- Cornea
- conjunctiva

- Iris
- Pupil

- Photoreceptors
- Yellow spot
- Blind spot

Optic nerve
Transmit impulse from photore-ceptors to the visual centre of the brain
Blind spot
The part where optic nerve begins
No vision
Yellow spot
Plenty of photore-ceptors are present
Maxi-mum visual clarity
Retina
The layer which has photore-ceptors
Lens
Elastic and transparent convex lens connected to ciliary muscles by ligaments
Pupil
The aperture seen at the centre of the iris
Regulate the intensity of light
Iris
The part of choroid seen behind the cornea
Pigment melanin
Cornea
The pro-jected tranparent anterior part of the sclera
Refracts light rays to focus on the retina

Sample questions

1. Identify the word pair relationship and fill in the blank.

   Yellow spot: maximum visual clarity

   ----------: no vision

2. Find out the correct statement from those given below

   a. The aperture seen in the iris is melanin

   b. Vitreous humor is seen behind the cornea

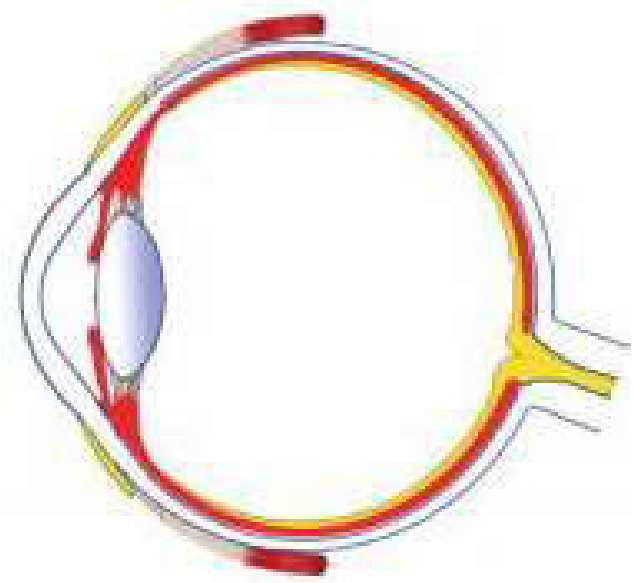
   c. Retina contain photoreceptors

   d. Iris refracts light to eye

3. Pick out the statements related to retina from those given the box

   Photoreceptors present, image is formed, does not transmit light, presence of melanin, blind spot is seen, aqueous humor is present

4. Redraw the figure and label the parts based on the indicators given below.

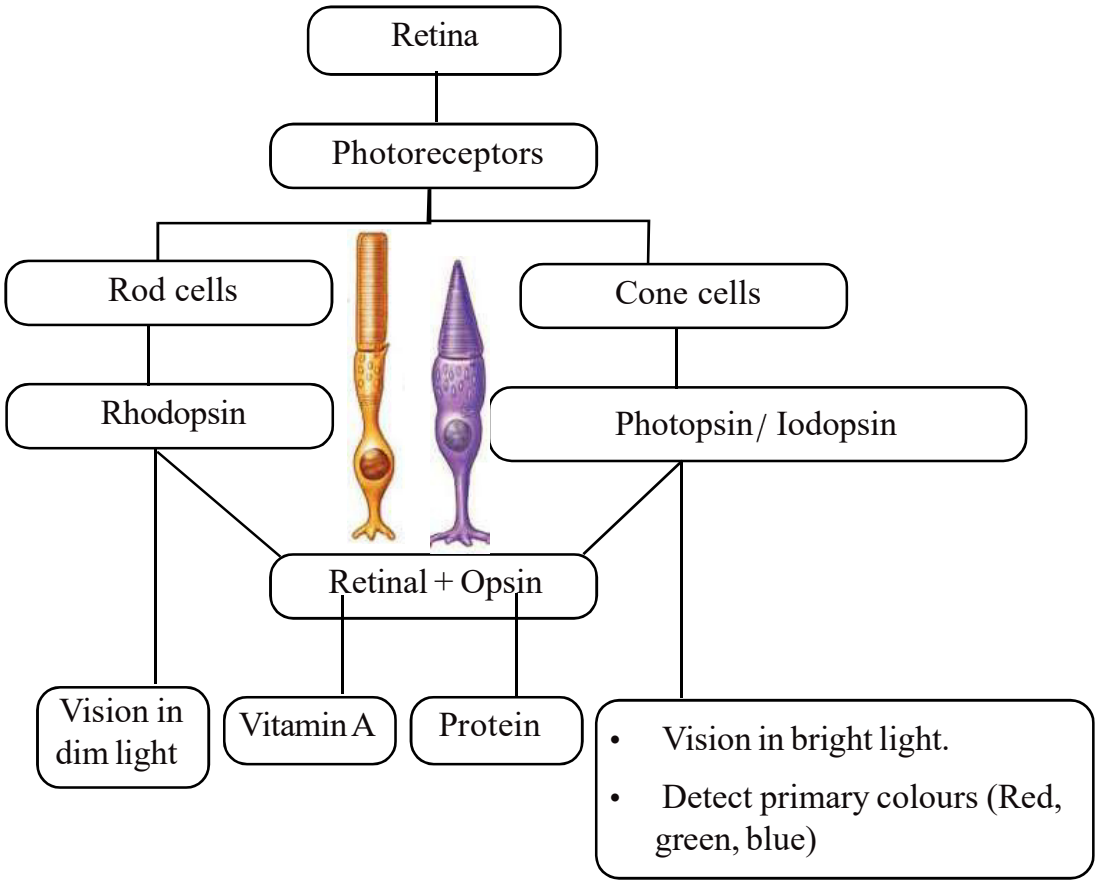


   a) The part where melanin present

   b) The part where optic nerve begins

   c) Transparent anterior part of sclera

Rod and cone cells- pigments and properties.



Sample questions

1. Identify the word pair relationship and fill in the blank.

   Rod cell : Rhodopsin

   Cone cell : ----------

2. Identify the picture and write two peculiarities of it?

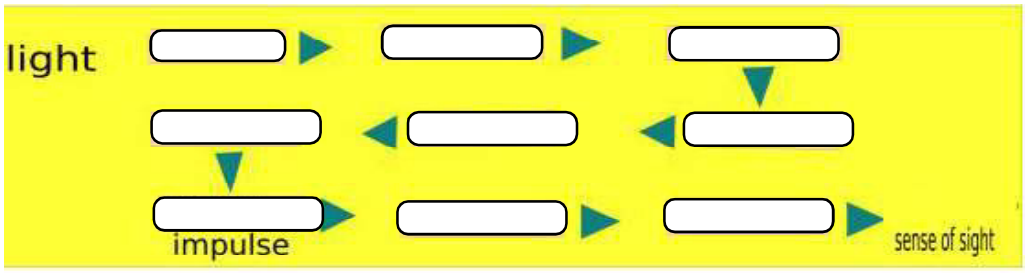
   Hint: Vision in dim light

3. "Vitamins play an important role in the proper functioning of the eye". Justify the statement with example?

III. Flowchart related to the sense of vision

Sample questions

1. Complete the flowchart on the sense of vision by selecting suitable terms from box given below?



Lens, pupil, cornea, vitreous humor, aqueous humor, optic nerve, cerebrum, retina

IV. Night blindness, Xerophthalmia, Colour blindness- causes and symptoms?

Main concepts

- Deficiency of vitamin A leads to night blindness and xerophthalmia.
- Night blindness - inability to see in dimlight
- Xerophthalmia -cornea opaque - blindness
- Defects in cone cells leads to colour blindness.

Sample questions

1. Identify the word pair relationship and fill in the blank.
   Deficiency of vitamin A : Night blindness
   Prolonged deficiency of vitamin A : ----------
2. "This eye defect is due to the defect in cone cells that determine certain colours".
   a) Identify the defect?
   b) What is the major symptom of this defect?
   c) What are the challenges faced by the affected people?

V. The process of taste and smell

Main concepts

Taste :

- **Chemoreceptors** present in the taste buds help to detect taste.
- Substances responsible for taste dissove in saliva, stimulate chemoreceptors and generate impulse.
- Impulses through respective nerve reach the brain and taste is experienced.

Smell :

- **Olfactory receptors** present in the nasal cavity helps to detect smell.
- Aromatic particles enter nostrils, dissolve in the mucus inside the nostrils and stimulate olfactory receptors.
- Impulses are generated and the impulses through olfactory nerve reaches cerebum.
- Experience the sense of Smell.

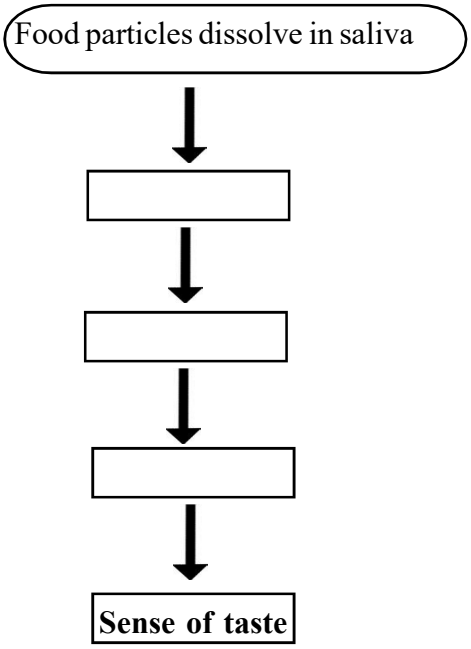
Sample questions

1. Identify the word pair relationship and fill in the blank.

   Tongue: Chemoreceptor

   Nose : ----------

2. Complete the flow chart on the sense of taste?



Sample questions

1. Pick the odd one out and write the common feature of others?

   Cornea, pupil, iris, lens

2. Identify the word pair relationship and fill in the blank?

   Optic nerve : eye

   ---------- : nose

3. Some statements related to the parts of eye and function are given in the box. Make suitable pairs?

Regulate the intensity of light, retina, carries impulse to cerebrum, cornea, formation of impulse, optic nerve, refracts light into eye, pupil.

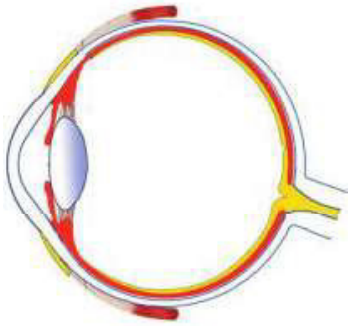
4. Complete the table on photoreceptors

Rod cells	a ---------
b ---------	Help vision in intense light
Rhodopsin	c ---------
Night blindness	d ---------

5. Make a flow chart related to the sense of smell

   Hint: particles of smell through air reach to nostrils

6. Redraw the figure and label the parts based on the indicators given below.



   a) The part of choroid behind the cornea

   b) The part connected by ciliary muscles

   c) The part with maximum visual clarity

Answer key

1. Iris. Others transmit light
2. Olfactory nerve
3. Regulate the intensity of light- pupil

   Carries impulse to cerebrum – optic nerve

   Formation of impulse - retina

   Refracts light in to eye - cornea

4. a. cone cells

   b. helps the vision in dimlight

   c. photopsin/Iodopsin

   d.colour blindness

5. Particles of smell mixed with mucus

↓

Olfactory receptors get stimulated

↓

Generation of impulse

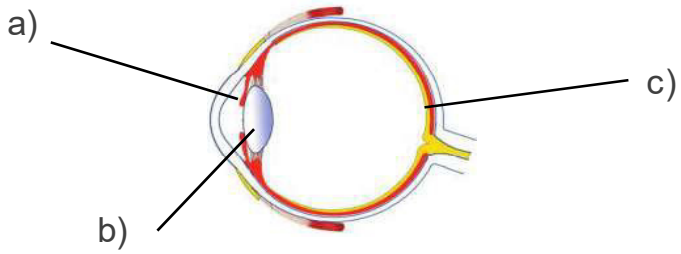
↓

Transmission of impulse to cerebrum through olfactory nerve

↓

Sense of smell

6. a) iris b) lens c) yellow spot



Chapter 3

Chemical messages for homeostasis

Focus Area

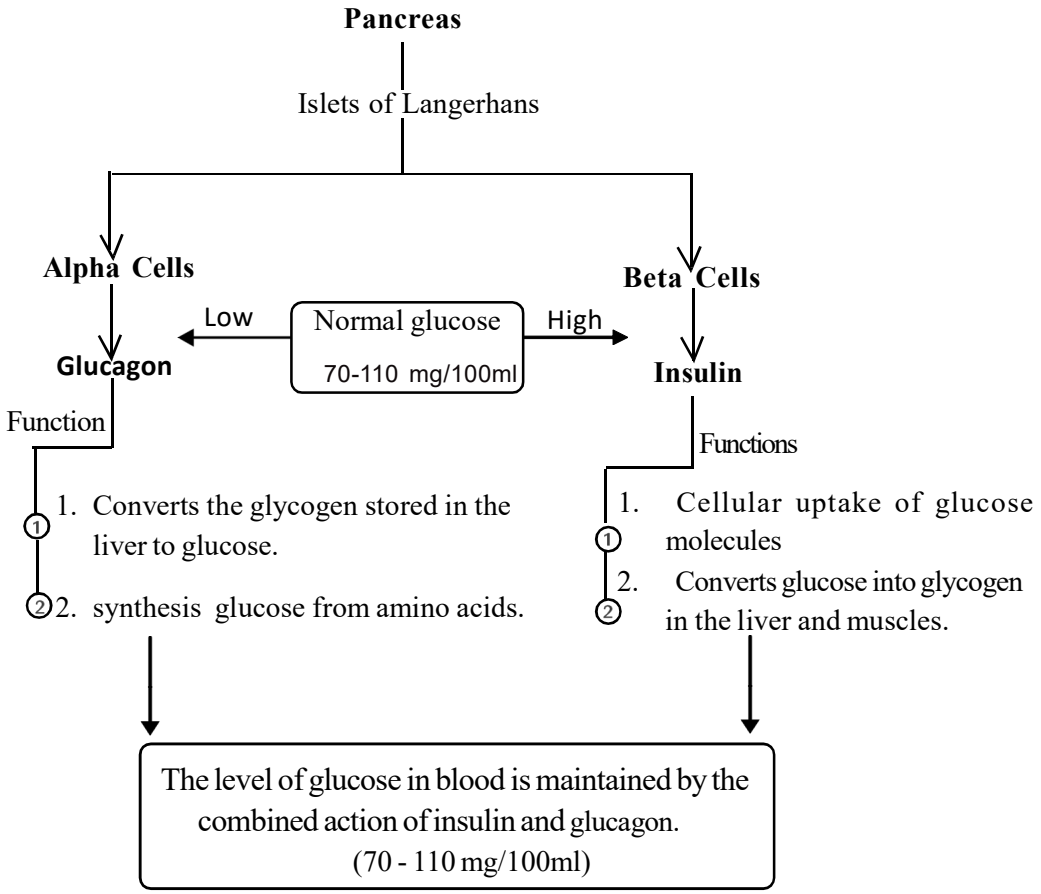
1. **Role of insulin and glucagon in maintaining glucose level in blood.**

   Diabetes : Reasons and symptoms
2. **Role of calcitonin and parathormone in maintaining calcium level in blood.**
3. **Causes and symptoms of dwarfism, gigantism, acromegaly**
4. **Pheromones-functions and examples**
5. **Natural plant hormones and their functions (Auxin, Gibberilin, Ethylene, Abscisic acid)**

I. Role of insulin and glucagon in maintaining glucose level in blood

Diabetes : Reasons and symptoms

Main Concepts



Model questions

1. Identify hormones with respect to their function.

	Hormones	Function
a)	.....	Synthesise glucose from amino acid
b)	.....	Converts glucose into glycogen in the liver and muscles.

2. The condition when the level of glucose before breakfast is above 126 mg/100 ml of blood
   a) Write the name of the condition.
   b) Write reason and symptoms of this condition.
3. What is the normal level of glucose in blood.
4. Name of hormones that regulate blood glucose level.

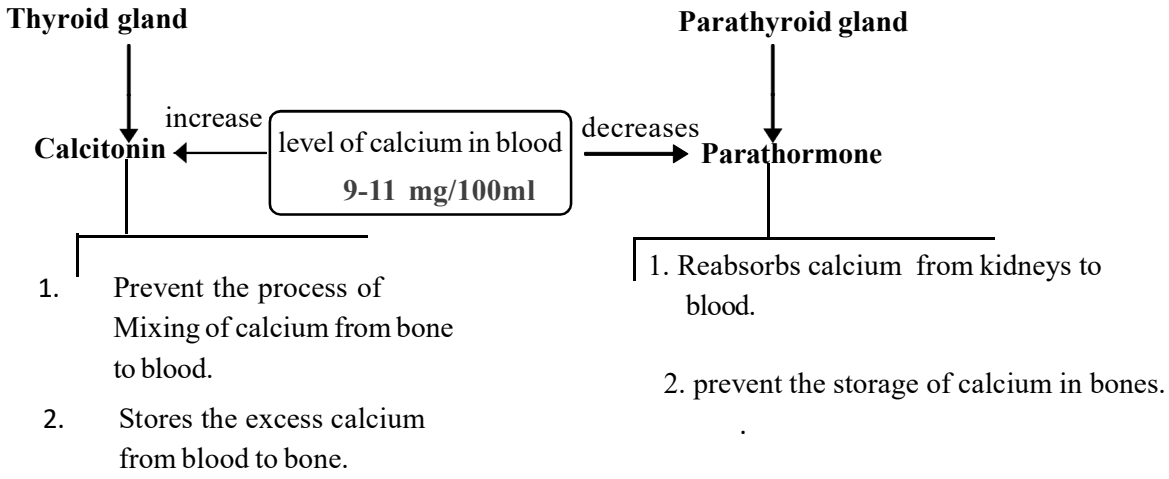
Answer Key

1. a) Glucagon b) Insulin
2. a) Diabetes

   b) **Reason** - Decreased production of insulin due to the destruction of beta cells. The inability of cells to utilize the insulin produced. **Symptoms** – increased appetite, thirst, frequent urination
3. 70-110 mg/100 ml
4. Insulin and glucagon

II. Role of calcitonin and parathormone in maintaining calcium level in blood.

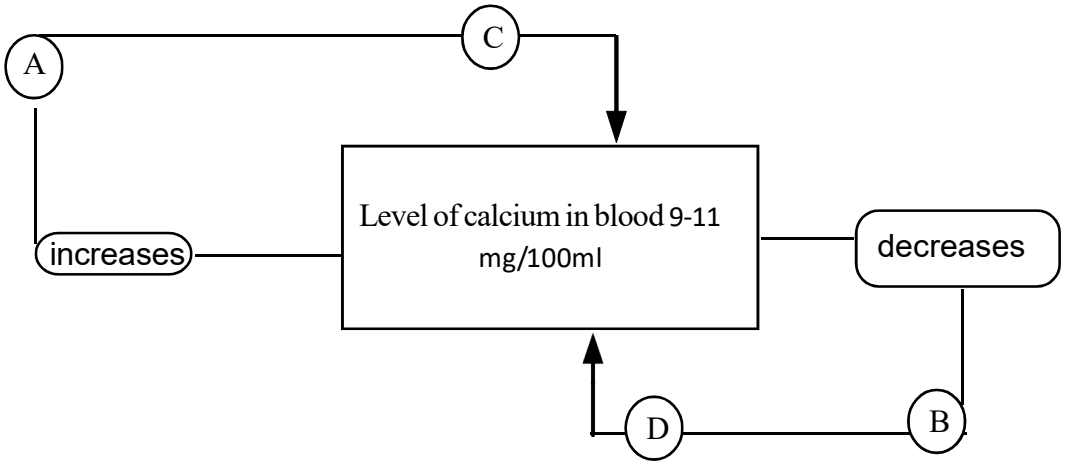
Main concept



Sample questions.

1. What is the normal level of calcium in blood.
2. Which hormone is produced when the level of calcium increases?
3. Which hormone is produced when the level of calcium in blood decreases?
4. Complete the illustration related to the regulation of level of calcium in blood.

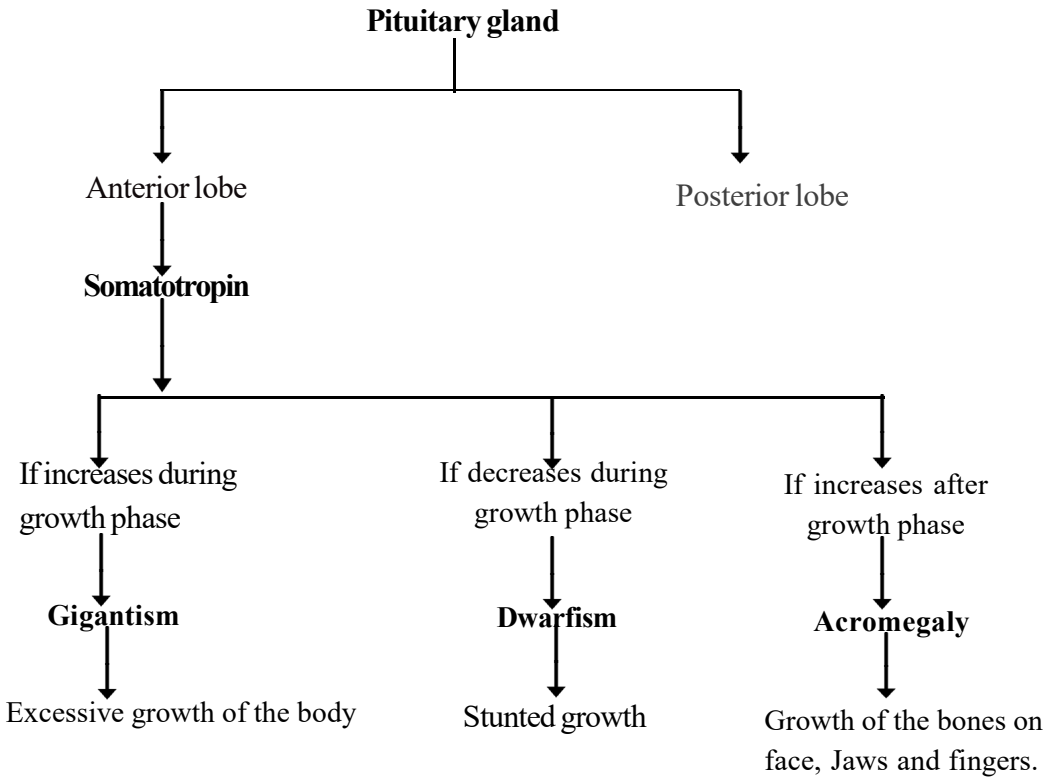
Hints : A, B - glands, C, D - Hormones



Answer key

1. 9-11 mg/100 ml.
2. Thyroid gland secretes Calcitonin.
3. Parathyroid gland secretes Parathormone.
4. A) Thyroid gland
   B) Parathyroid gland
   C) Calcitonin
   D) Parathormone.

III. **Causes and symptoms of Gigantism, Acromegaly, Dwarfism**



Sample question

1. Complete the table suitably

Disease	Condition	Symptoms
a)	Increased production of Somatotropin during growth phase	Excessive growth of the body.
Dwarfism	b)	Stunted growth.
c)	Excessive production of Somatotropin after the growth the phase	d) .....

2 Find the odd and write the peculiarities of others.

Gigantism, Acromegaly, Dwarfism, Diabetes

3. Correct the underlined portion of the following statement.

a) Excessive production of Somatotropin during growth phase leads to Acromegaly.

b) Decreased production of Somatotropin during growth phase leads to Gigantism

Answer Key

1. Complete the table suitably

a) Gigantism

b) Decreased production of Somatotropin during the growth phase.

c) Acromegaly

d) Growth of the bones on the face, jaws and fingers.

2 Diabetes (others are abnormal conditions that occur due to variations in the production of growth hormone)

3. a) Gigantism

b) Dwarfism

IV Pheromones - Functions, Examples

Main concepts

- Pheromones are Chemical substances that are secreted by certain animals to the surroundings.
- Pheromones are used for attracting mates, informing the availability of food, determining the path of travel, signaling dangers etc,
- The chemical messages of pheromones help honey bees and termites to live in colonies.
- Artificial pheromones are used for pest control in agricultural fields. eg: pheromone trap

Animals	Pheromones
Musk deer	muscone
civet cat	civeton
female silkworm moth	bombykol

Sample questions

1. Honey bees and termites live in colonies.
   a) Which chemical help them to line in colonies?
   b) Write other two functions of this chemical substance?
   c) What is the use of this chemical in agricultural field?
2. Complete the table.

Animals	Pheromones
Musk deer	a).....
b).....	civeton
female silkworm moth	c).....

Answer key

1 a) Pheromones

b) Attracting mates, informing the availability of food, Determining the path of travel, Signaling dangers etc (Any two)

c) Pheromone traps are used in agricultural field for pest control.

2. a) Muscone

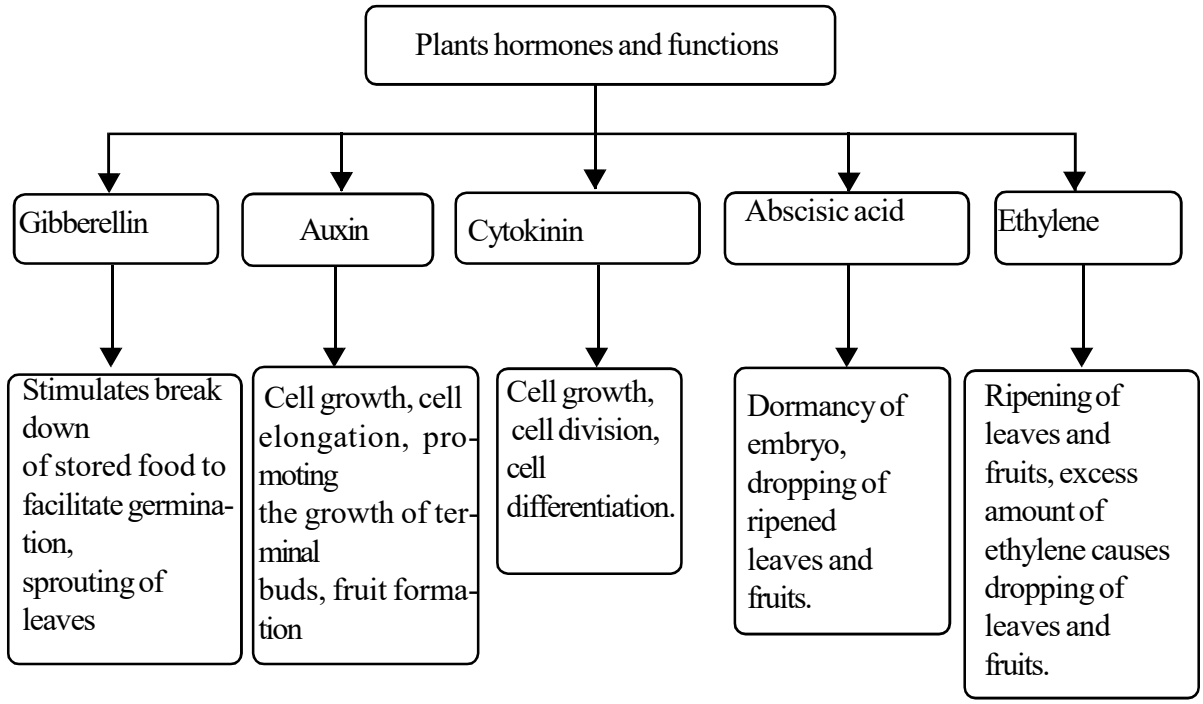
b) Civet cat

c) Bombykol

V. **Natural plant hormones and their functions (Auxin, Gibberellin, Ethylene, Abscisic acid, Cytokinin).**

Main concepts

- Plant hormones control and co-ordinate life activities in plants.
- These are also called Plant Growth Regulators.



Sample questions

1. Write the name of Hormone based on the given functions.
   a) Dropping of ripened leaves and fruits
   b) Facilitate germination
2. Complete the table

Plant hormones	functions
a)	Cell growth, cell elongation, promoting the growth of terminal buds, fruit formation
Cytokinin	b) .....
c)	Ripening of leaves and fruits.

Answer Key

1 a) Abscisic acid
   b) Gibberellin
2. a) Auxin
   b) Cell growth, cell division, cell differentiation.
   c) Ethylene

Chapter 4

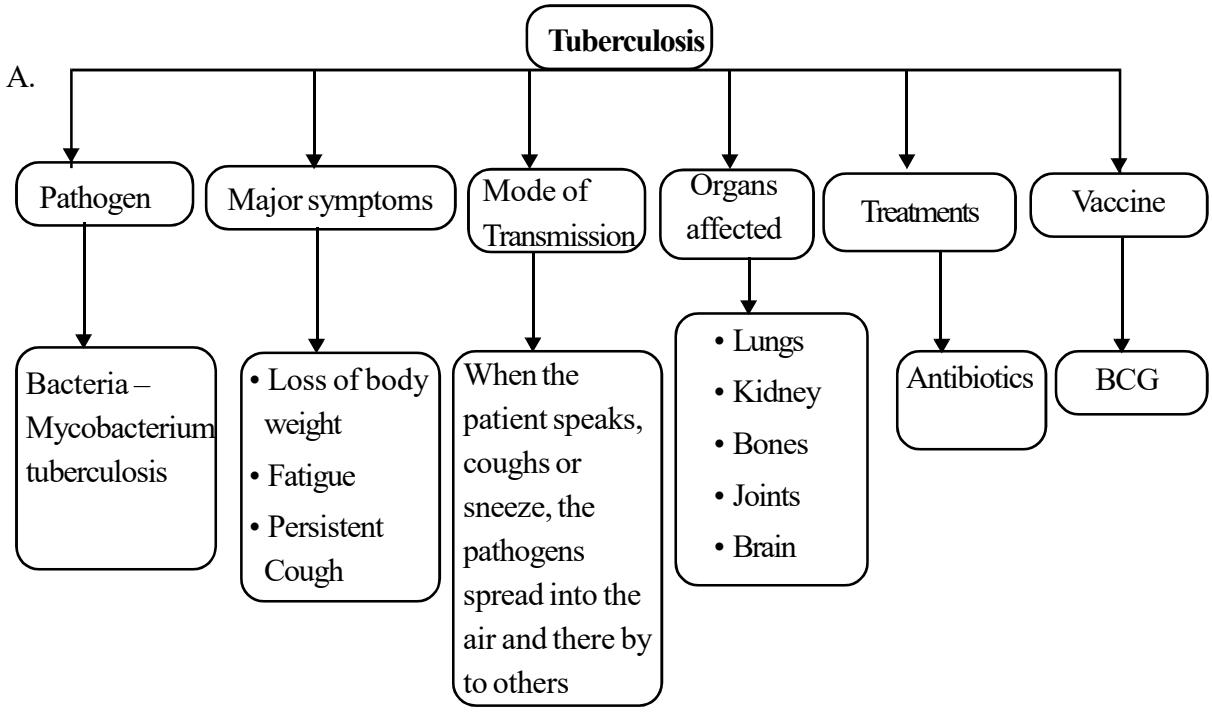
Keeping diseases away

Focus Area:

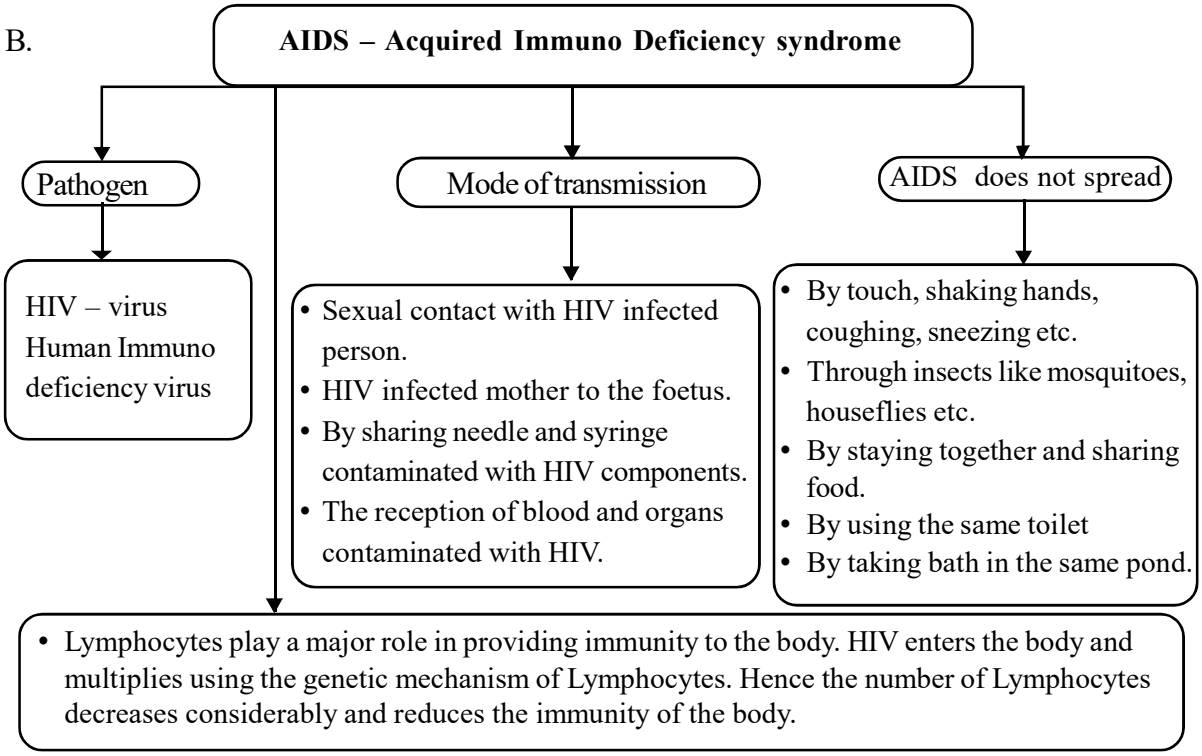
1. **Pathogens, symptoms, mode of transmission & Tuberculosis, AIDS and Malaria.**
2. **Genetic Disease – Haemophilia.**
3. **Cancer – Causes and Treatment.**

I. **Pathogens and symptoms of Tuberculosis, AIDS and Malaria – Contagious methods**.

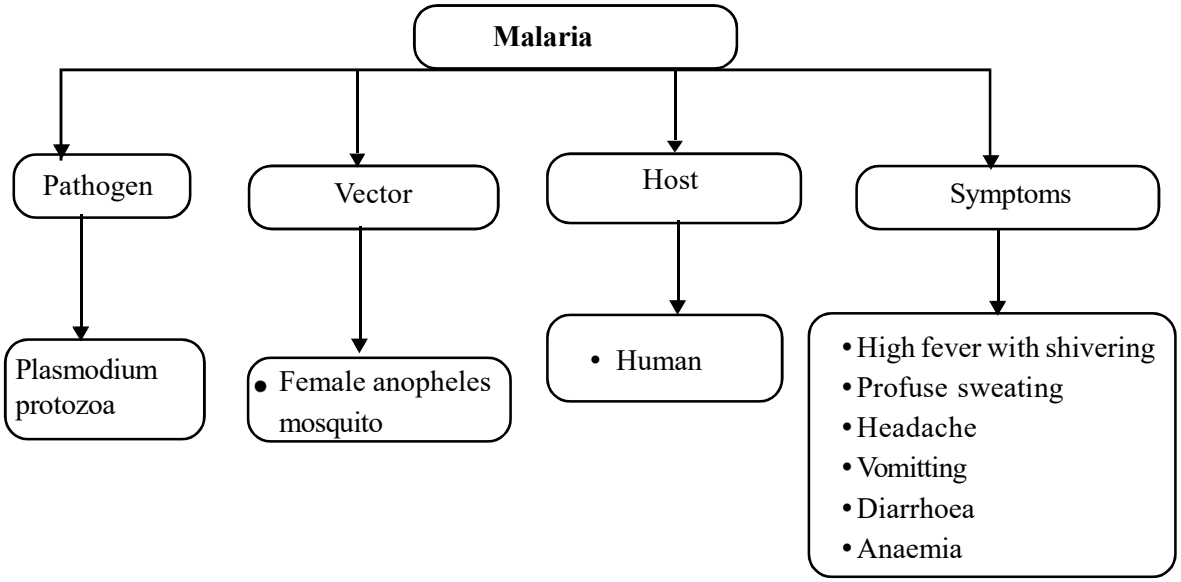
A.



B.



C



Sample questions

1. Indentify the word pair relations and fill in the blanks.

   AIDS : Virus

   Malaria: ----------

2. From the below mentioned diseases find out the disease that spreads through unsterilized needle and syringe?

   Tuberculosis, AIDS, Malaria, Haemophilia

3. From the following diseases find out the disease in which mosquitoes act as vector?

   Tuberculosis, AIDS, Haemophilia, Malaria.

4. Make suitable pairs given in the box.

Through contact, Female Anopheles Mosquitoes, Through air, AIDS, Tuberculosis, Cancer, Maleria.

5. Name the vaccine given against Tuberculosis.

6. Which disease is caused due to the decrease in no. of lymphocytes

7. Choose the right one from the following statements.

a. AIDS does not spread through staying together and sharing food.

b. AIDS does not spread through the reception of blood and organs contaminated with HIV.

c. AIDS spread through sexual contact with HIV infected person.

d. AIDS spread by using the same toilet.

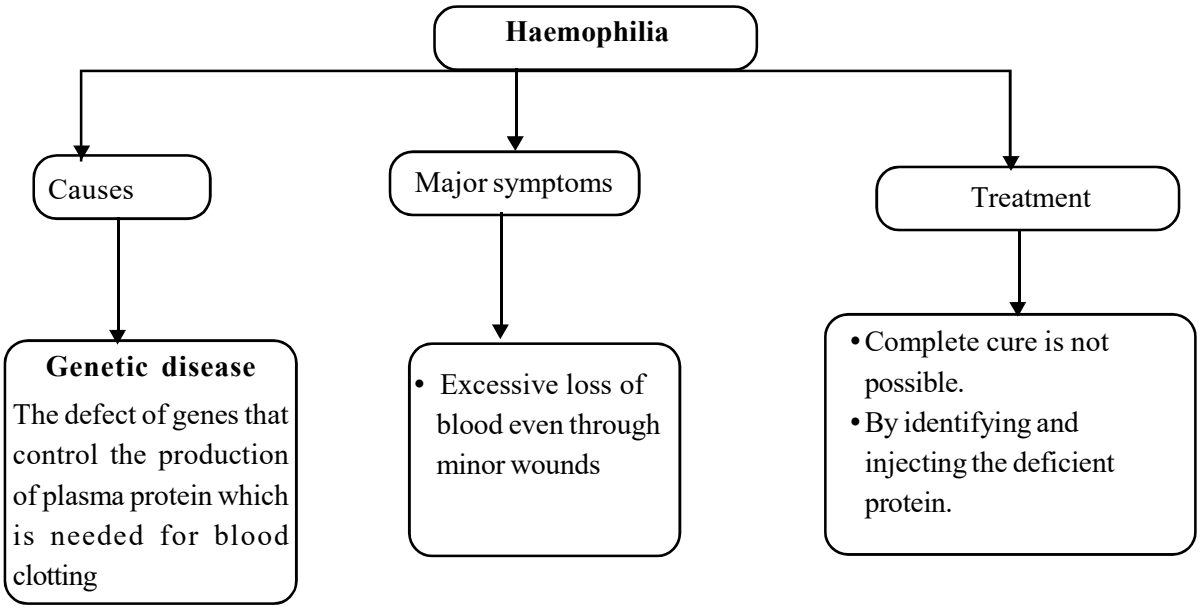
8. Arrange the column A with B.

Diseases	Symptoms
1 AIDS	a. High fever with shivering, Headache, Profuse sweating, Vomitting, Diarrhoea, Anaemia
2 Tuberculosis	b. Reduces the immunity of the body
3 Malaria	c. Loss of body weight, fatigue, persistent cough
	d. Excess blood is lost even through minor wounds

Answer Key

1. Plasmodium Protozoa
2. AIDS
3. Malaria
4. Tuberculosis – Through air
   Malaria – Female Anopheles mosquito
   AIDS – Through contact
5. BCG
6. AIDS
7. Right statement – a, c
8. 1-(b)
   2-(c)
   3-(a)

II. Genetic Disease – haemophilia



Sample questions.

1. Find the odd one and write the common features of others.

   Tuberculosis, Malaria, Haemophilia, AIDs.

2. "Haemophilia is a disease which does not have a complete treatment". Do you agree with this statement? Substantiate your answer?

3. How can we temporarily control the blood flow from the wound of a persons, who is suffering from haemophilia?

4. "Haemophilia, is caused by some defective genes in our body". Which are those genes?

5. `What is the symptom of Haemophilia?

Answer Key

1. Haemophilia others are caused by pathogens.

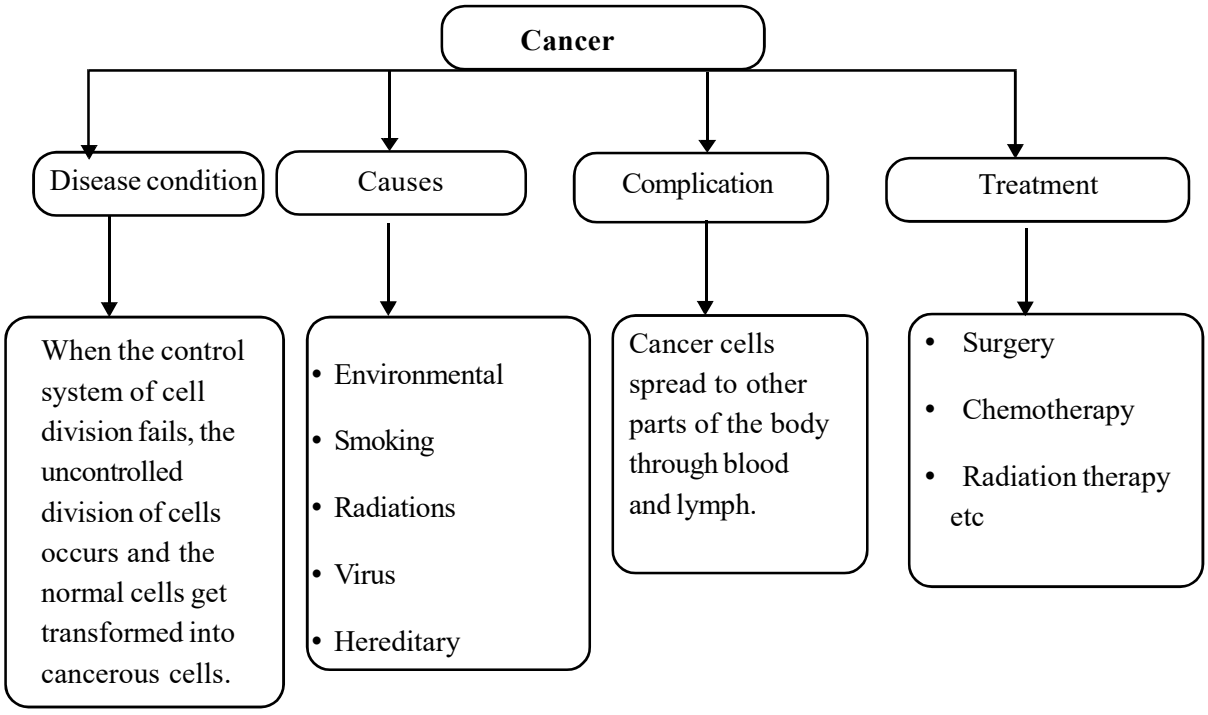
2. Yes, As Haemophilia is a genetic disease, a complete cure is not possible at present.

3. Temporary relief is by identifying and injecting the deficient protein.

4. The gene that controls the synthesis of protein which helps to clot the blood.

5. Excess blood is lost even though minor wounds.

III Cancer – Causes and Treatment



Sample questions

1. Find the odd one and write the common features of others.

   Radiation therapy, surgery, vaccine, chemotherapy.

2. How do the cancer cells spread to other parts of the body?

3. What are the factors responsible for the cause of cancer?

4. Why do we say that early diagnosis is important in the treatment of cancer?

5. Arrange the table suitably.

Disease	Pathogen / cause
1 Malaria	a. Mycobacterium tuberculosis
2 Cancer	b. HIV
3 Tuberculosis	c. Plasmodium
4 AIDS	d. Defect of gene
	e. Uncontrolled cell division

Answer Key

1. Vaccine, others used in the treatment of cancer.

2. Through blood and lymph.

3. Environmental factors, smoking, radiations, Virus, Hereditary factors.

4. As recovery from this disease is difficult if the disease becomes severe.

5. 1-c

   2-e

   3-a

   4-b

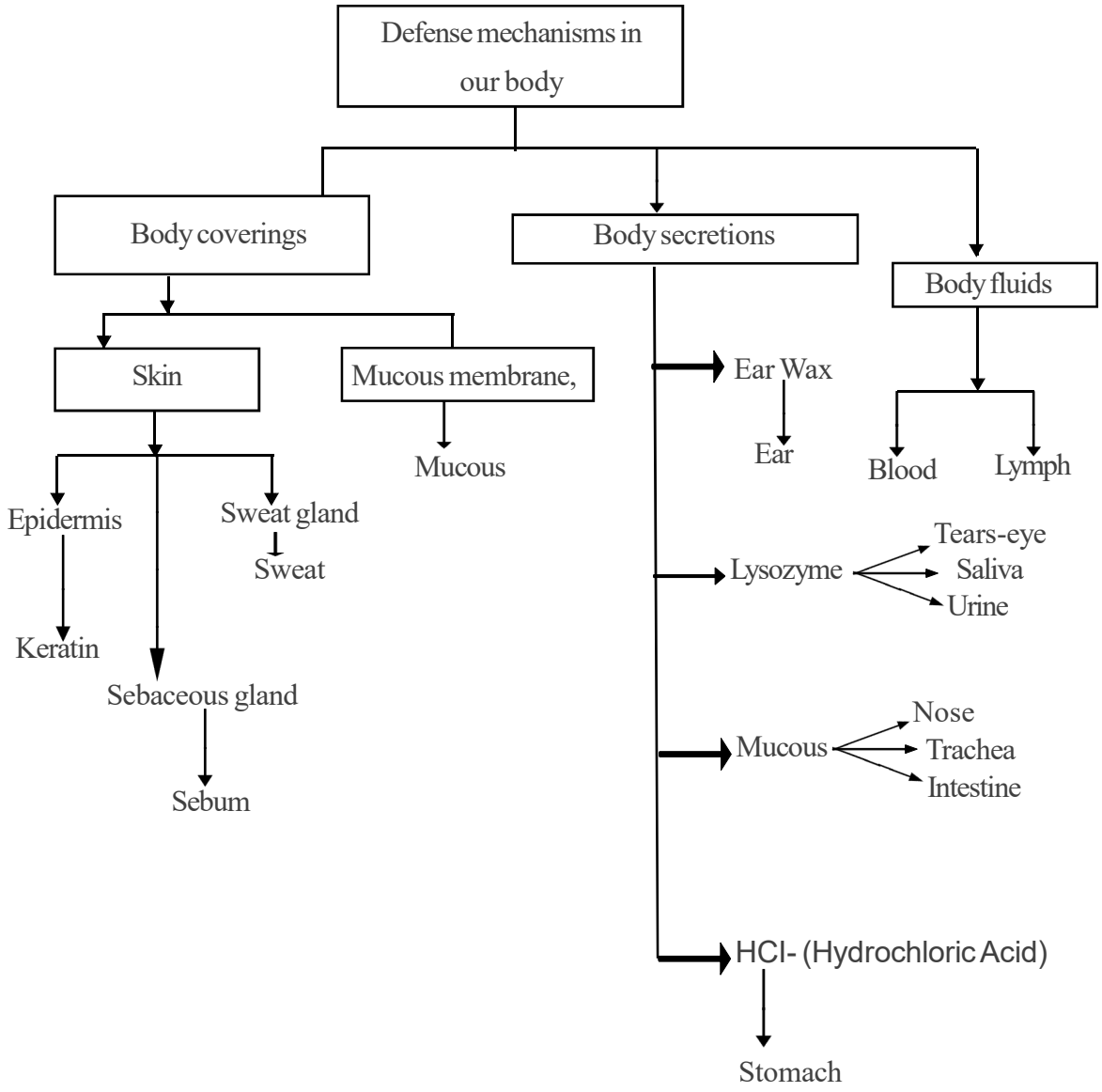
Chapter 5

Soldiers of Defense

Focus Area

1. **Importance of skin (Epidermis, Sebaceous gland, Sweat gland) and body secretions (Ear wax, Mucous, Lysozyme, Hydrochloric acid) in defense mechanism.**
2. **Stages of Phagocytosis, fever (flow chart)**
3. **Importance of vaccination, Actions of vaccines, examples of vaccines.**
4. **Antibiotics, Side effects**
5. **Antigen and antibodies in different Blood groups, Blood transfusion - Things to be taken care of while transfusing blood.**

I. Importance of skin (Epiderms, sebaceous gland, sweat gland) and body secretions (Ear wax, mucous, Lysozyme, Hydrochloric acid)



I. Sample questions

1. Identify the word pair relationship and fill in the blanks.

   Sebaceous gland : Sebum

   ---------- : Sweat

2. Choose the odd one and write common features of others.

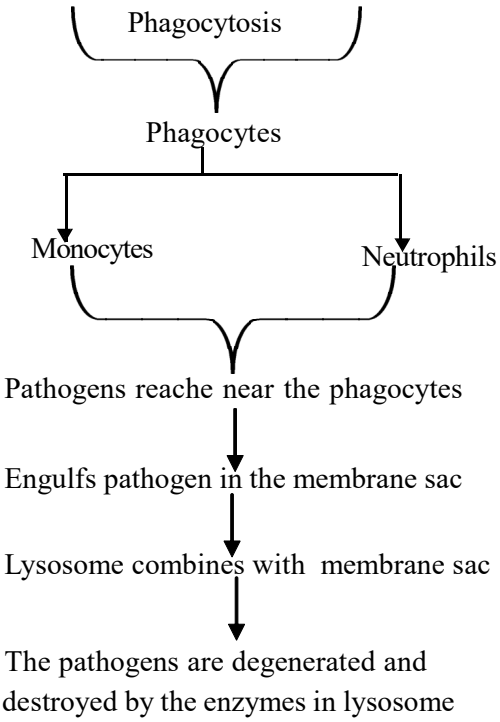
   Mucus, Blood, Saliva, Tears

3. What is the role of mucous membrane in destroying pathogens?.

4. Complete the table.

Organs	Secretions
Ear	(a)
(b)	Saliva
Nose	(c)
(d)	HCL

II**. A. Phagocytosis - Stages**



Main concepts

- Phagocytosis is the process of engulfing and destroying the germs.
- The cells that are engaged in this process are called phagocytes.
- The white blood cells namely monocytes and neutrophils are phagocytes.

II. Sample Questions

1. Choose the phagocytes from the white blood cells given below:

   (Lymphocyte, Monocyte , Eosinophils, Neutrophil)

2. Re-arrange the following steps based on Phagocytosis.

   (1) Lysosome combines with membrane sac.
   (2) Pathogen reach near the Phagocytes.
   (3) Pathogens are degenerated and destroyed by the enzymes in Lysosome
   (4) Engulf pathogens in the membrance sac)

B. Fever

1. **Main concepts**

- fever is the defence mechanism of the body
- The normal body temperature is 37^0 C (98.6^0F)
- Fever is a condition when the body temperature raises above the normal level

2. The stages to form fever

- Pathogens enter the body.
- The presence of toxins produced by the pathogens stimulates the white blood cells.
  The chemical substances produced by the white blood cells raises the body temperature
- The rise in body temperature reduces the rate of multiplication of pathogens. Increases the effect of Phagocytosis.

3. If the rise in body temperature persist for a long time it may badly affect the internal organs including the brain. Hence if fever increases, it is necessary to seek medical assistances immediately.

II. B. Sample questions

1. Complete the steps, based on the formation of fever.

Pathogens enter the body

↓

(a)

↓

(b)

↓

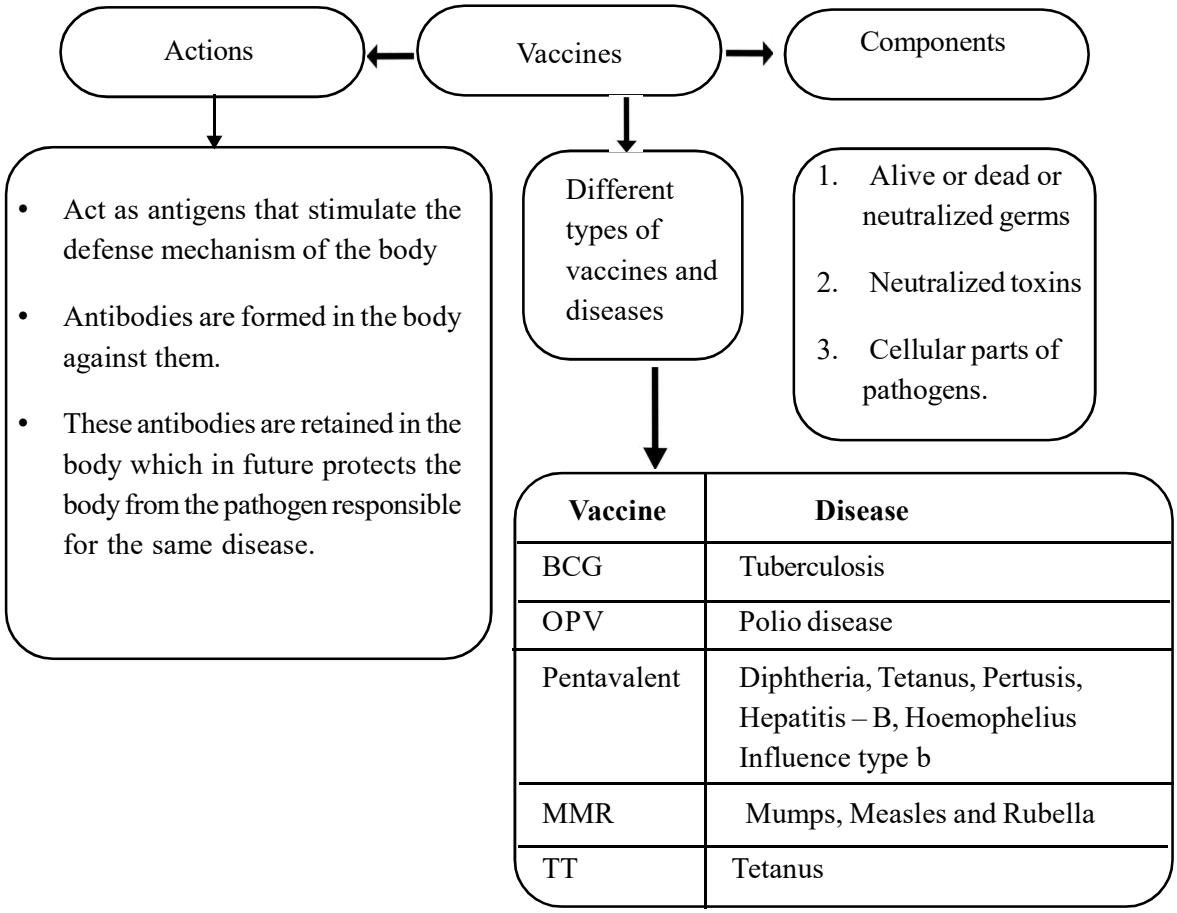
The rise of the body temperature, reduces the rate of multiplication of pathogens. Increase the effect of Pagocytosis.

2. If fever increases it is necessary to seek medical assistance, immediately. Why?

III. Vaccination - Importance, action of vaccines, examples of vaccines.

Main concept.

- Immunization is the artificial method to make the defense cells alert against the attack of pathogens.
- Vaccines are the substances used for artificial Immunization



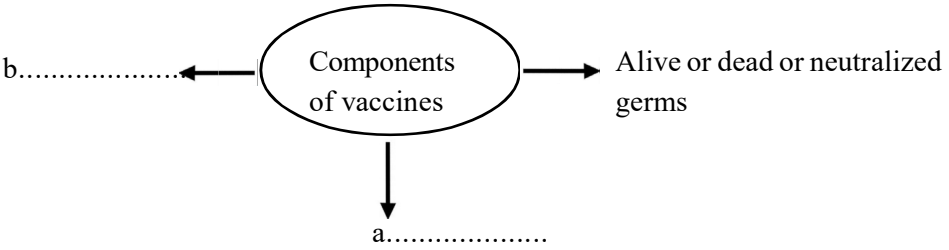
Vaccine	Disease
BCG	Tuberculosis
OPV	Polio disease
Pentavalent	Diphtheria, Tetanus, Pertusis, Hepatitis – B, Hoemophelius Influence type b
MMR	Mumps, Measles and Rubella
TT	Tetanus

III. Sample questions

1. Make suitable pairs given in the box.

   (BCG, Tetanus, Polio, TT, OPV, Tuberculosis, MMR, Rubella)

2. Pentavalent vaccines act against which diseases?
3. Complete the following illustration.



4. How vaccines protects our body from Pathogens?.

IV. Antibiotics – Side effects

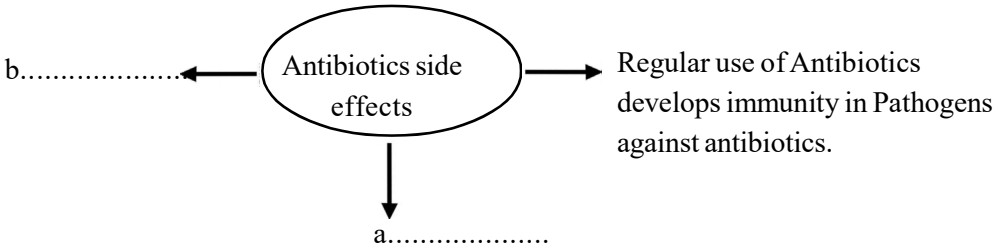
- Medicines that are extracted from microorganisms like bacteria, fungi etc. and used to destroy bacteria are called antibiotics.
- Sr. Alexander Fleming discovered antibiotics.
- Regular uses of antibiotics develops immunity in pathogen against antibiotics.
- Destroy useful bacteria in the body.
- Reduces the quantity of some vitamins in the body.
- Antifungal medicines are used to destroy fungi.
- Antiviral medicines are used to control viruses.

IV Sample questions

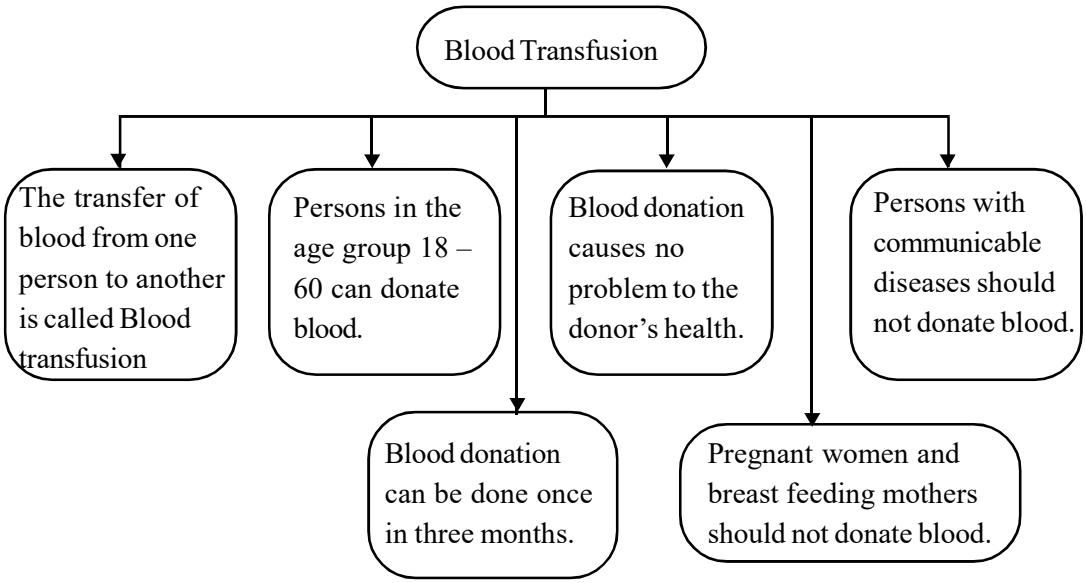
1. Fungus : Antifungal medicines.

   Virus : .....

2. Complete the illustration



V. Blood groups – Antigens, Antibodies, Blood transfusion, importance.



Main concepts

- The basis of blood grouping is the presence of Antigen **A** and antigen **B** in red blood cells.
- The blood group of a person is named according to the antigen present in that persons blood.
- In blood transfusion, certain antibodies present in the blood plasma are of special importance.
- In blood group **A** antibody **'b'** and in group **B** antibody **'a'** are present.
- In addition to antigen **A** and **B** another antigen called **D** on Rh factor is present in the cell membrane of red blood cells of certain person.
- The blood groups in which Rh factor is present are known as positive blood groups and those without Rh factor are called negative blood groups.
- On receiving unmatching blood, the antigen present in the donor's blood and the antibody present in the recipient's blood will react with each other and form a blood clot.

V. Sample questions

1. Identify the blood group having 3 antigens
   (A^{-ve}, O^{+ve}, AB^{+ve}, B^{+ve})
2. Complete the table.

Blood group	Antigen	Antibody
A	A	....1...
B	2	a
...3..	...4...	Nil
...5..	Nil	...6..

1. Choose the correct statements from the following based on the blood tranfusion
   1. Persons with communicable diseases should not donate blood.
   2. Blood donation causes problem to the donor's health.
   3. Persons in the age group 18 – 65 can donate blood.
   4. Pregnant women and breast feeding mothers should not donate blood.
   5. Blood donation can be done once in three months.

Answer Key

I. 1. Sweat gland

2. Blood, others are body Secretions included in defence mechanism.

3. Pathogens trapped in the mucous produced by Mucous membrane get destroyed. The destroyed germs are expelled out by the cilia cells of the mucus membrane.

4. a. Ear Wax, b. Mouth c. Mucous, d. Stomach

II. A. 1) Monocyte, Neutrophil

2) 2 , 4, 1, 3

II B. 1. a) The presence of toxins produced by the pathogens stimulates the white blood cells.

b) The chemical substance produced by the white blood cells rises the body temperature.

2. If the rise in body temparature persist for a long time it may badly affect the interrnal organs including the brain.

III. 1. BCG - Tuberculosis

TT - Tetanus

OPV - Polio disease

MMR - Rubella

2. Diphtheria, pertusis, tetanus, hepatitis B, Heomophelus influenza type **b**

3. a. Neutralized toxins

b. Cellular parts of pathogens

4. They act as antigens that stimulate defence mechanism of the body. Antibodies are formed in the body. These antibodies are retained in the body which in future protects the body from the pathogen responsible for the same disease.

IV. 1. Anti viral medicines

2. a. Destroy useful bacteria in the body

b. Reduces the quantity of some vitamins in the body.

V. 1. AB^{+ve}

2. 1. b

2. B

3. AB

4. A, B

5. O Group

6. a, b

3. 1, 4, 5

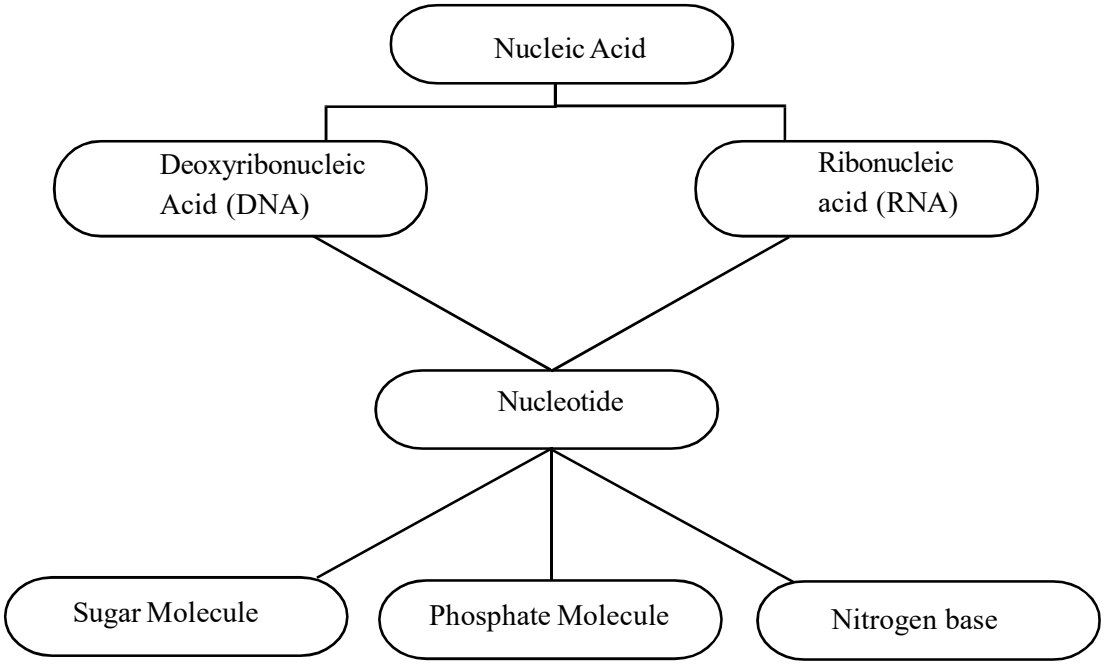
Chapter 6

Unravelling Genetic Mysteries

Focus Area

1. **DNA and RNA - Structure, Comparison**
2. **Process of involved in Protein synthesis.**
3. **Genetic mysteries behind the determination of sex in child**

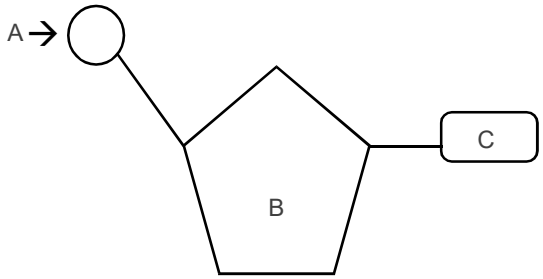
1. DNA and RNA - Structure, Comparison



Main concepts

- Two scientists James Watson and Francis Crick, presented the double helical model of DNA.
- DNA molecule contains two strands - a structure with two long strands made up of sugar and phosphate and rungs with Nitrogen bases.
- DNA has four kinds of nitrogen bases namely adenine, thymine, guanine and cytosine. Adenine pairs only with thymine and guanine with cytosine.
- Single stranded RNAs have ribose sugar, phosphate and Nitrogen bases.
- Four kinds of Nitrogen bases in RNA are adenine, uracil, guanine and cytosine.

Sample Questions



a) What does the illustration indicates?

b) Identify and label the parts A, B, C in the illustration.

2. Identify the word pair relation and answer the questions

Adenine : Thymine

. . . . . : Cytosine

3. Complete the table

	Strands	Sugar Molecule	Nitrogen bases
DNA	...a...	Deoxyribose Sugar	Adenine, ...c... Guanine, ...d...
RNA	1 strand	...b...	...e..., uracil ...f..., cytosine

II. Process involved in protein synthesis.

Gene action / Protein Synthesis

Main concepts

- Genes contain information for protein synthesis.
- Genes are particular segments of DNA .
- DNA does not participate directly in protein synthesis.
- RNA that carries information from DNA – mRNA (Messenger RNA) reaches ribosome found in the cytoplasm (out side the nucleus).
- The cell organelle which helps in protein synthesis is ribosome.
- tRNA (transfer RNA) carries amino acids to the ribosome.

- rRNA (ribosomal RNA) are also seen associated with ribosome.
- Protein molecule is synthesised by the combined activities of all these molecules.

Sample questions

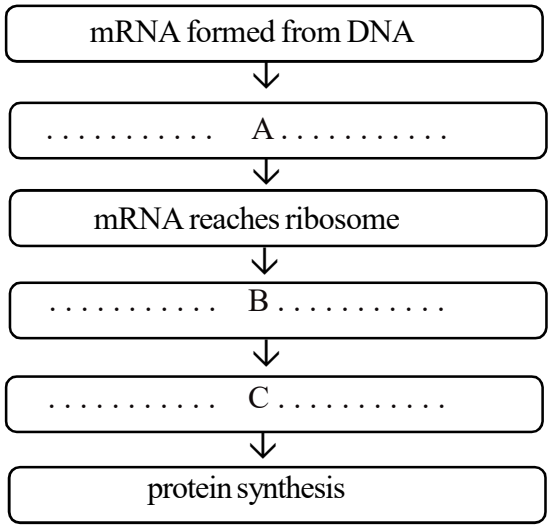
1. a) From the below mentioned RNAs choose the RNA which carries information from DNA for protein synthesis.

   tRNA, rRNA, mRNA, sRNA

   b) From the below mentioned cell organells select the cell organelle which helps in protein synthesis?

   Mitochondria, lysosome, ribosome, golgi complex

2. Observe the flow chart.

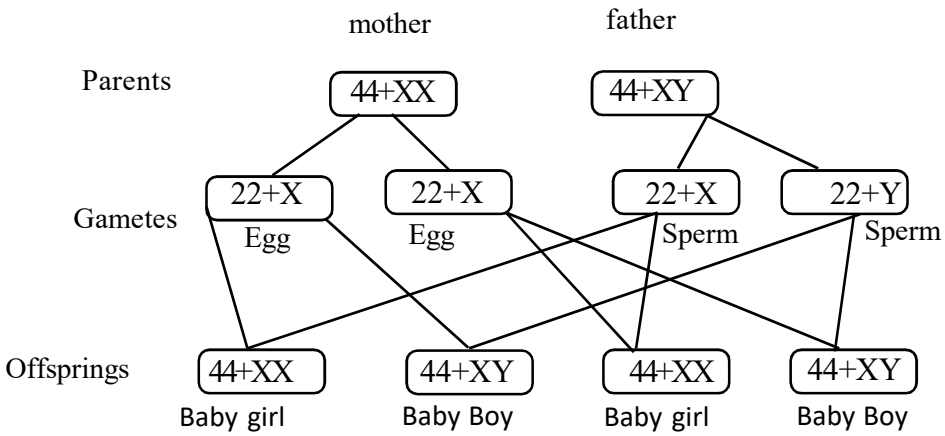


a) Identify the process mentioned in the flowchart?

b) Complete the flow chart by filling A, B, C in the given process.

III. Genetic mysteries behind the determination of sex in child.

Determination of Sex in humans



Main concepts

- The nucleus of each human cell contains 46 chromosomes (23 pairs)
- 44 – Somatic chromosomes (22 pairs), 2 –Sex chromosomes (1 Pair) (44+XX- female, 44+XY– male)
- Possibility for the birth of a male or female child-equal.
- The XYchromosomes of father determine the sex of the child.
- The child with XXchromosomes will be a girl and the child with XY chromosomes will be a boy.

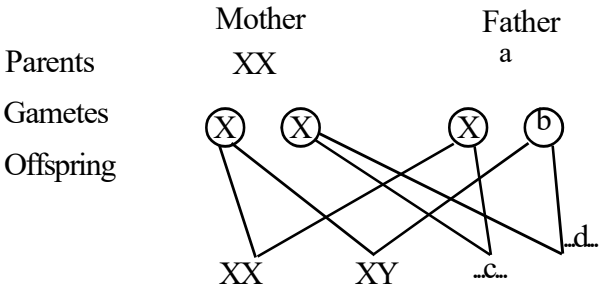
Sample questions

- Identify the word pair relations and answer the questions

  Female : 44+XX

  Male : .....

2. By observing the illustration of sex determination in Human beings answer the following questions.



a) Observe the illustration above and fill in the blanks a, b, c, d.

b) What is the possibility for the birth of a male or a female child.

c) "When only female children are borne, mothers are being criticized". Do you agree with this statement? What scientific explanation do you give for this statement?

Answer key

I. 1. a) Nucleotide

b) A phosphate, B - Sugar, C- nitrogen base.

2. Guanine,

3. a. 2 strands b) ribose sugar, c) Thymine, d) Cytosine, e) Adenine, f) guanine

II. 1. a) mRNA b) ribosome

2. a) Protein synthesis / Gene action

b) A – mRNA reaches outside the nucleus.

B- tRNA brings different kinds of amino acids to ribosome

C- Based on the information in mRNA ribosome synthesize protein by adding aminoacids

III 1. a) 44+XY

2. a) XY

b) (Y)

c) XX

d) XY

b) Equal possibility

c) No, I disagree with this statement. The XY chromosomes of the father determine the sex of the child.

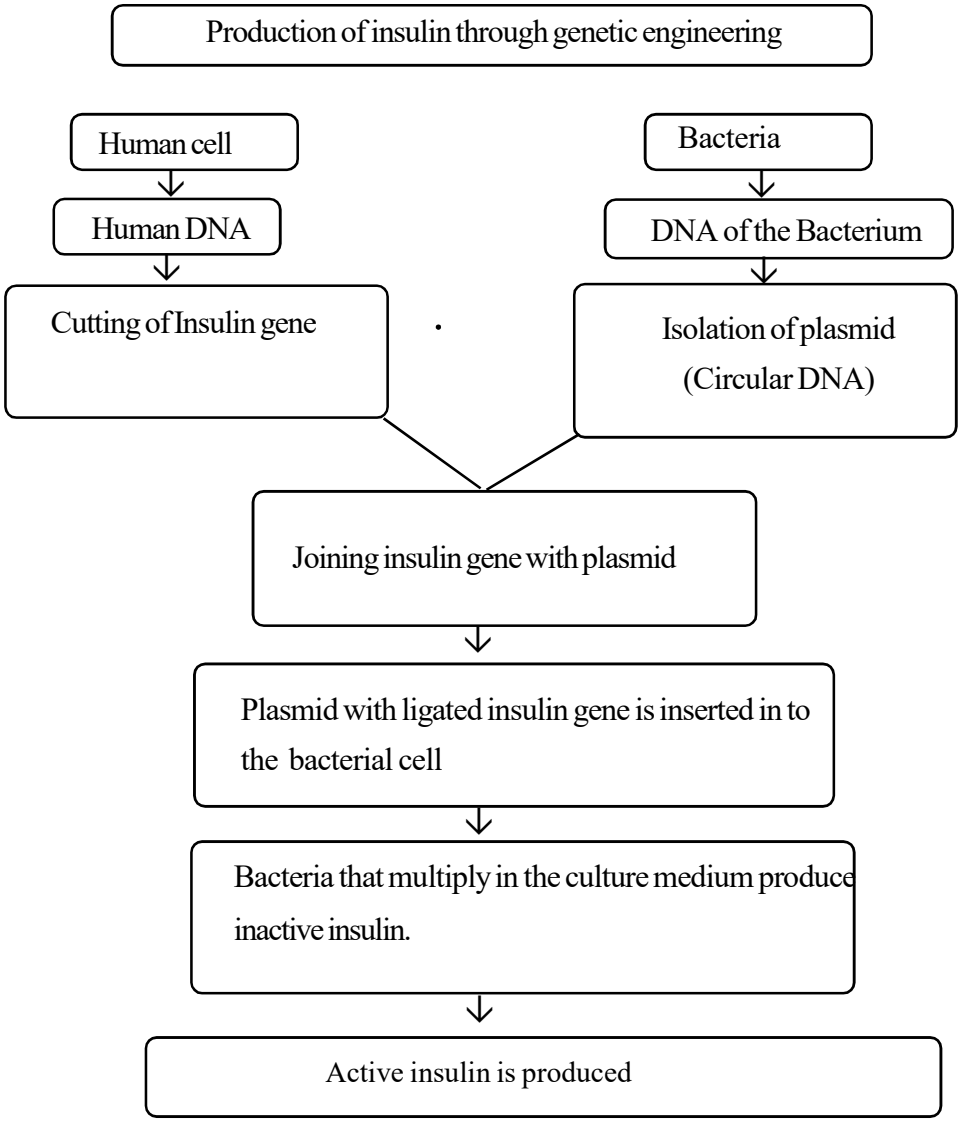
Chapter 7

Genetics of the future

Focus Area

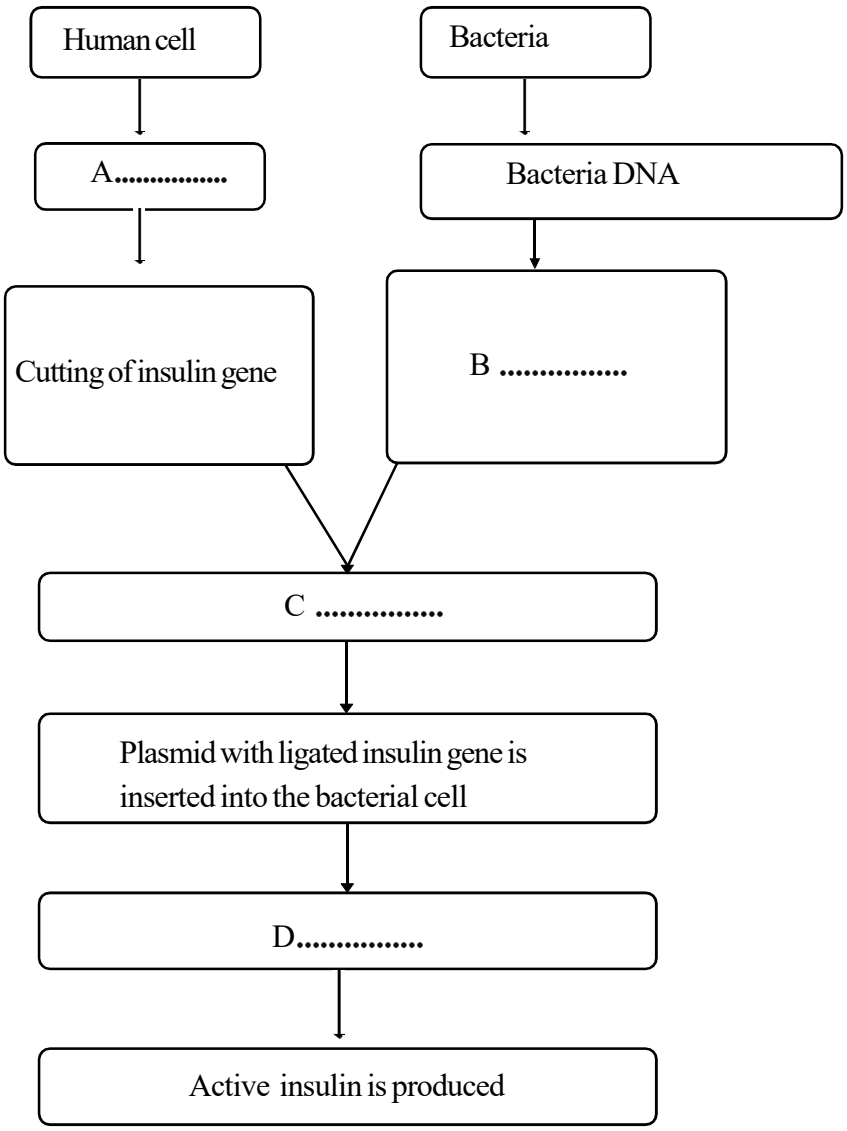
1. **Insulin production by Genetic Engineering**
2. **Role of Genetic Scissors, Genetic Glue, Vectors In Genetic Engineering.**
3. **Scope of DNA Finger Printing.**

1. Insulin production by genetic engineering.



Sample questions

1. Observe the illustration and answer the following questions.



a. Name the process mentioned in the flow chart

b. Complete the flow chart by filling A, B, C, D in the given process.

II. Role of Genetic Scissors, Genetic glue, vectors in genetic engineering.

Main concepts

- Enzymes are used to cut and join genes.
- The enzyme 'restriction endonuclease' known as 'genetic scissors' is used to cut genes.
- The enzyme 'ligase' known as 'genetic glue' is used for joining.
- A gene from one cell is transferred to another cell by using suitable vectors.
- Plasmids in bacteria are generally used as vectors.
- Vectors which contain ligated genes enter the target cells and the new genes become a part of the genetic constitution of target cells.

Sample questions.

1. Identify the word pair relations and answer the questions.

   Genetic scissors : Restriction endonuclease.

   . . . . . : Ligase

2. How does transfer of gene from one cell to another cell take place?

3. How do the new genes become apart of the genetic constitution of target cells?

III. Scope of DNA finger printing

Main concepts

- The technology of testing the arrangement of nucleotides-DNA profiling / DNA testing
- Alec Jeffery paved the way for DNA testing (1984).
- Just like the difference in the finger print of each person, the arrangement of nucleotides in each person also differs. Hence this technology is also called DNA finger printing
- The arrangement of nucleotides among close relatives have many similarities. Hence DNA fingerprinting is helpful to find out hereditary characteristics, to identify real parents in case of parental dispute and to identify persons found after long periods of missing due to natural calamities or wars.
- DNA of the Skin, hair, nail, blood and other body fluids obtained from the place of murder, robbery etc is compared with the DNA of suspected persons. Thus the real culprit can be identified from among the suspected persons through this method.

Sample Questions

1. Name the scientist who paved the way for DNA finger printing?
2. Define DNA profiling.
3. What is the basic principle of DNA profiling?
4. Write the four main concepts that can be included in the poster designed for conveying the scope of DNA fingerprinting.

Answer Key

I. 1. a) production of Insulin through genetic engineering.

   b) A- Human DNA, B – Isolation of plasmid.

   C) Joining Insulin gene with plasmid.

   D) Bacteria that multiply in the culture medium produce inactive insulin.

II. 1. Genetic glue.

2. By using suitable vectors (Plasmid in Bacteria)

3. Vectors which contain ligated genes enter the target cells and the new genes become a part of the genetic constitution of target cells.

III. 1. Alec Jeffery.

2. The technology of testing the arrangement of nucleotides in DNA

3. Just like the difference in the fingerprint of each person the arrangement of nucleotides in each person also diffens. The arrangement of nucleotides among close relatives have many similarities.

4. i. To find out hereditary characteristics

ii. To identify real parents in cases of parental dispute.

iii. To identify persons found after long periods of missing due to natural calamities or wars.

iv) To identify the real culprit.

Chapter 8

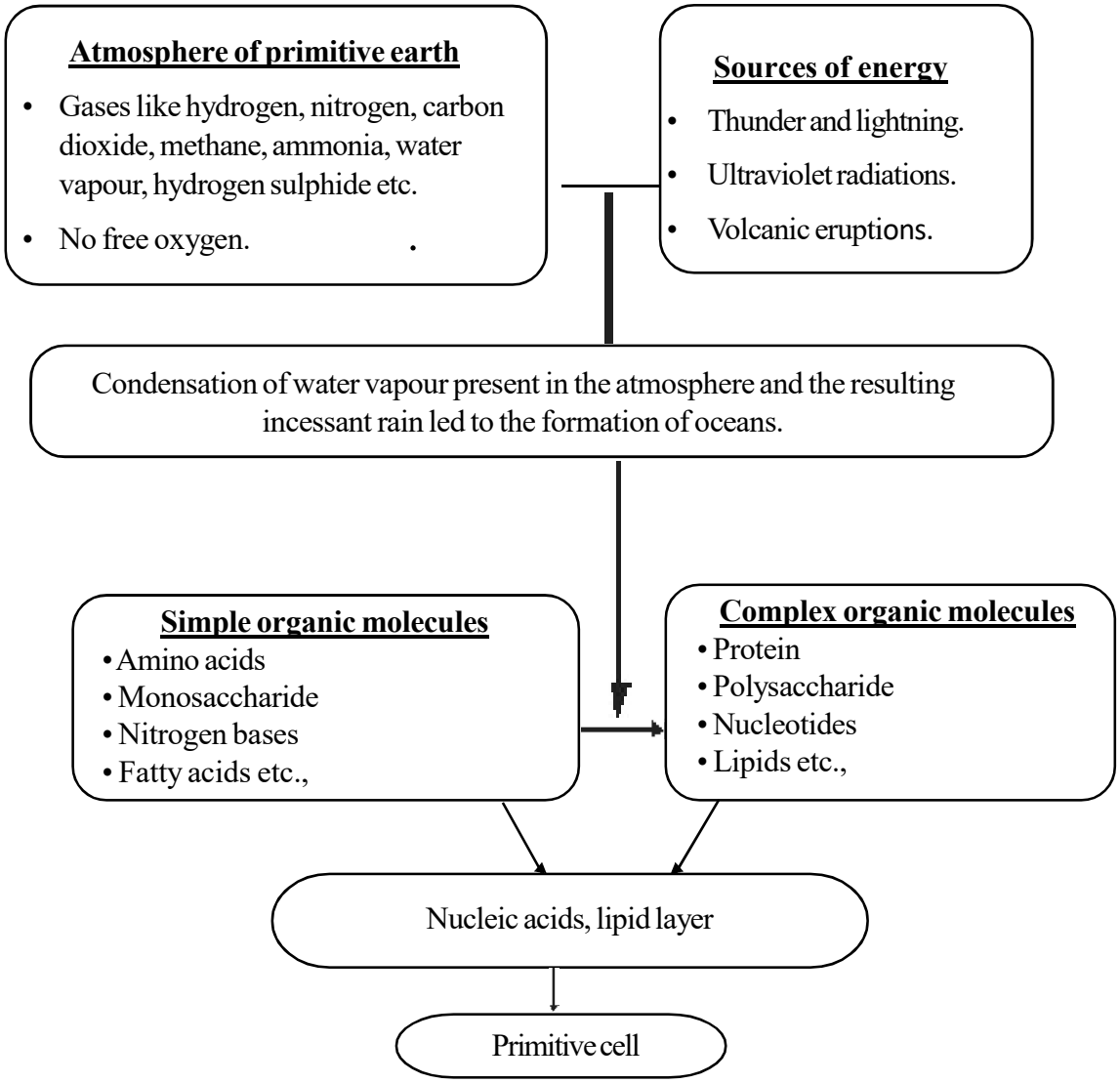
The paths traversed by Life

Focus Area

1. **Chemical evolution theory, Chemical reactions that led to the formation of living cell.**
2. **Main points of natural selection theory by Charles Darwin**

I. Chemical evolution theory, Chemical reactions that led to the formation of living cell.

Chemical Evolution



Main concepts

- The chemical evolution theory – The more predominant theory on the origin of life on earth .
- The proponents of this theory are the Russian scientist A.I. Oparin and the British scientist J.B.S.Haldane.

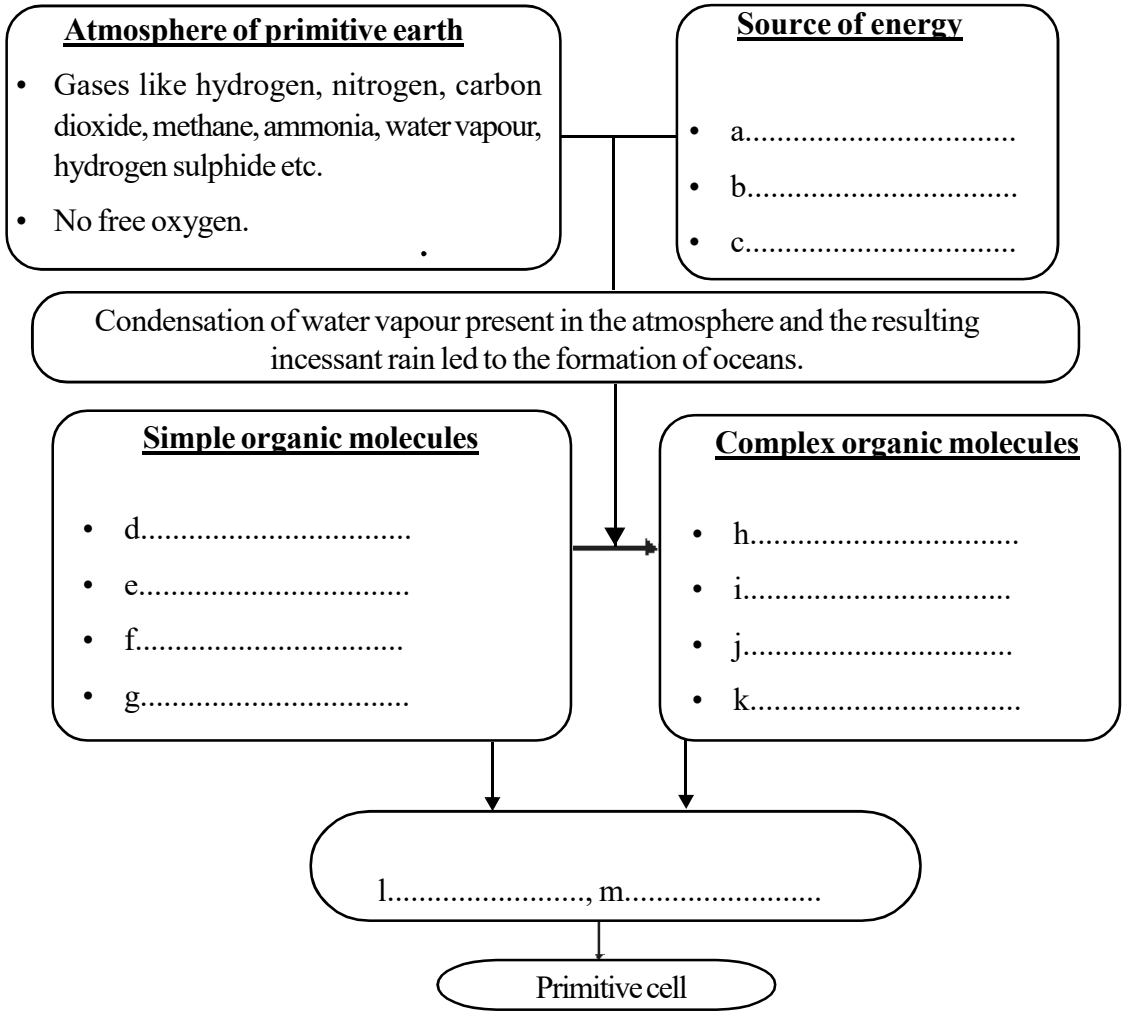
- The scientific basis of this hypothesis regarding the origin of life was later proved through various experiments. eg: Urey - Miller experiment
- Urey and Miller conducted their experiments by artificially recreating the atmosphere of primitive earth that contained methane, ammonia, hydrogen and water vapour.

Sample questions.

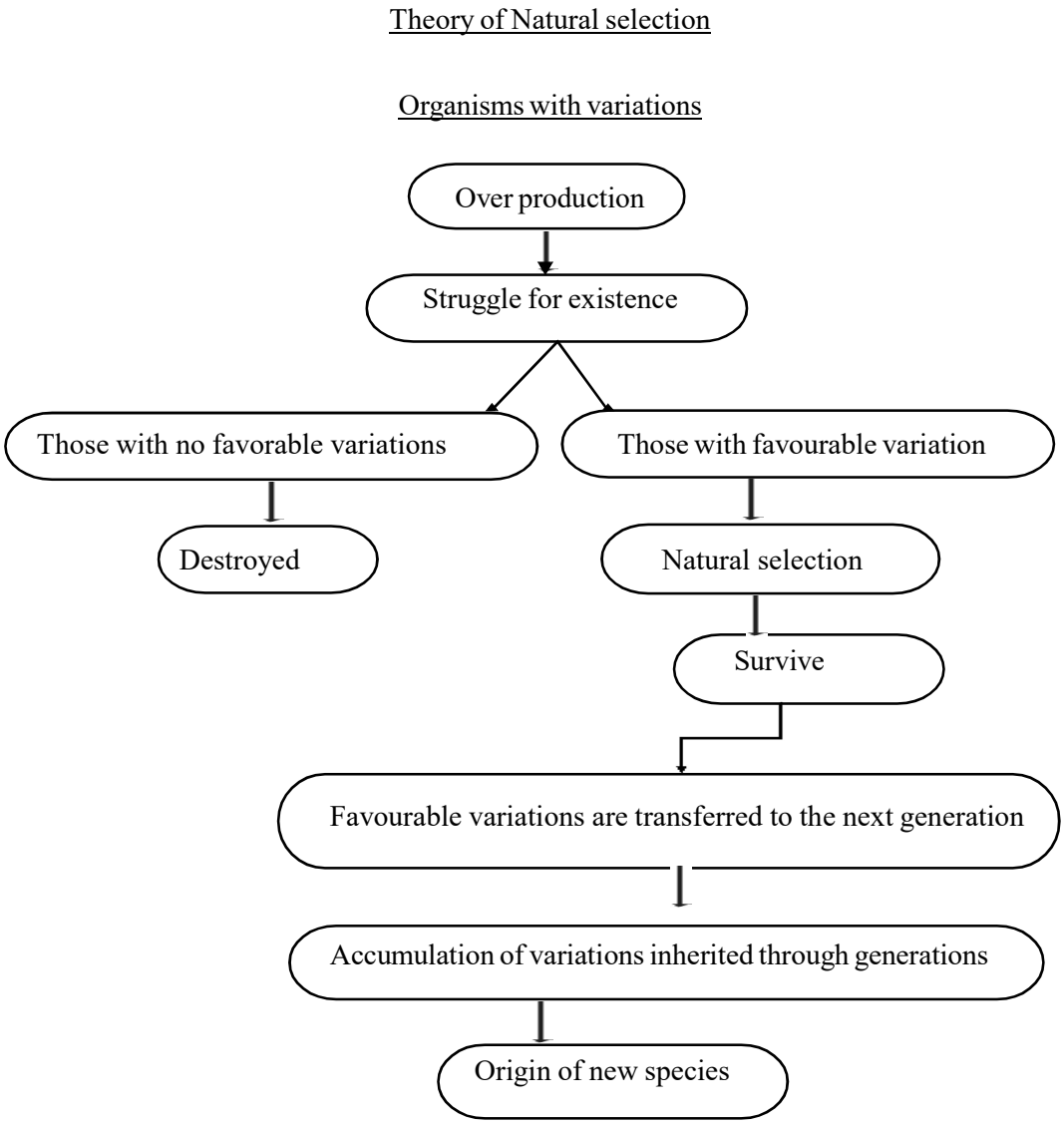
1. Who were the proponents of chemical evolution theory?
2. Given below are some hints related to the chemical evolution theory. Prepare a table, suitably.

Amino acids, Nitrogen base, Simple organic molecules, Polysaccharides, Protein, Monosaccharides, Nucleotides, Complex organic molecules.

3 Complete the illustration related to chemical evolution theory.



II. Main points of Natural selection theory put forward by Charles Darwin.



Main concepts

- A logical scientific theory on evolution was 'The theory of Natural selection' put forward by- Charles Robert Darwin.
- Charles Darwin formulated his theory on the basis of studies conducted on organisms in Galapagos Island and also from the ideas of population theory by Robert Malthus
- Every species produces more number of offsprings than that can survive on earth and they compete with one another for food, space and mates.
- Many variations are visible in organisms and that may be favourable or unfavourable.
- Those with favouarble variations are inherited through generations and new species are formed.
- Darwin presented his theory in the renowned text – "Origin of species by means of Natural selection".

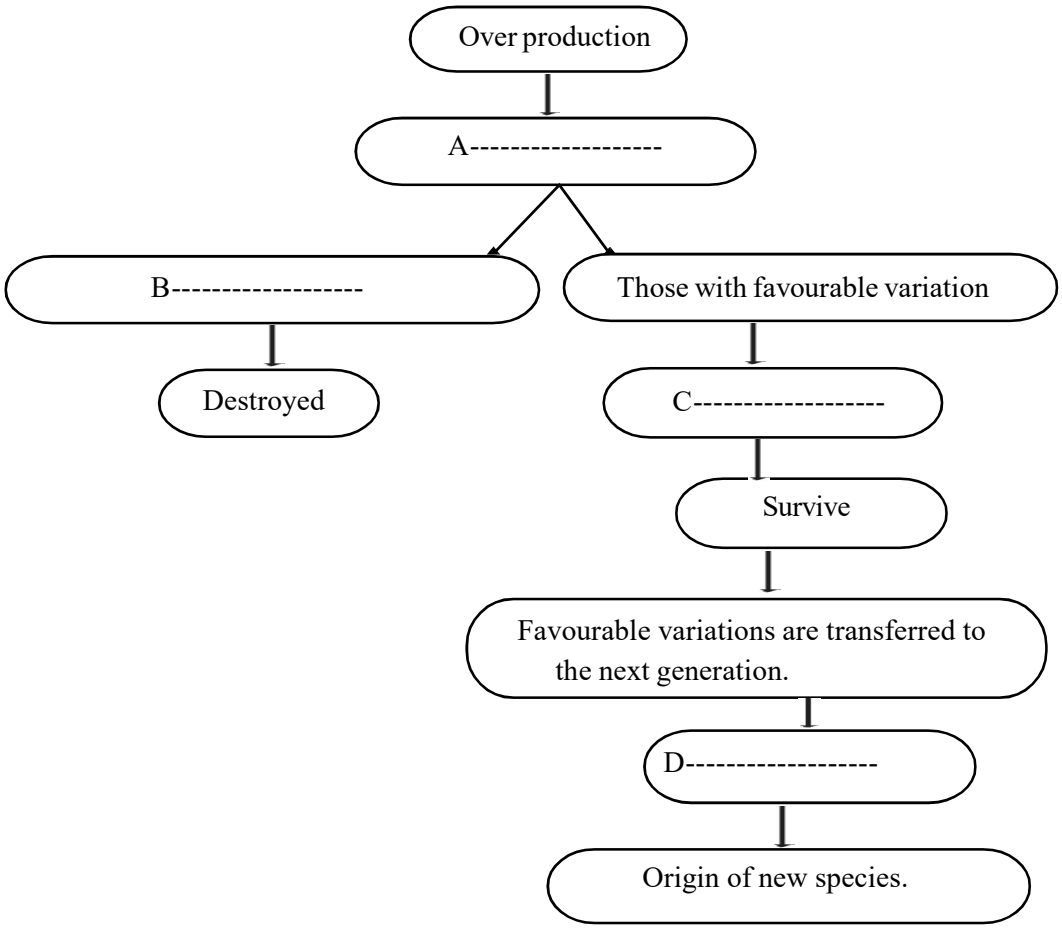
- Though Darwin identified that continuous variations occurred in organisms, he could not explain the reasons for these variations.
- Neo Darwinism – Darwinism was revised in the light of new information from the fields of genetics, cytology, geology and paleontology.

Sample questions

1. Who formulated the theory of Natural selection?
2. What are the factors that influenced Darwin for formulating the theory of Natural selection?
3. What are the main issues faced by organisms due to over production?
4. How do variations affect the existence of organisms?
5. How do the favourable variations help to form new species?
6. Observe the flowchart and answer the following questions?

   a) Identify and name the theory related to the given flow chart?

   b) Fill the parts A, B, C, D in the flow chart



Answer Key

I. 1. A I Oparin, J.B.S.Haldane

2.

Simple organic Molecules	Complex organic Molecules
• Amino acids	• Protein
• Nitrogen bases	• Nucleotides
• Monosaccharide	• Polysaccharides

3. a) Thunder and lighting b)Ultraviolet radiations

c) volcanic eruptions d) Amino acids

e) Monosaccharide f) Nitrogen bases

g) Fatty acids h) protein

i) Polysacharide j) Nucleotides

k) Lipids l) Nucleic acids m) Lipid layer

II. 1. Charles Robert Darwin

2. Based on the studies conducted on organisms in Galapagos Islands , population theory by Robert Malthus.

3. Organisms compete with one another for food, space and mates due to overproduction.

4. Variation may be favourable or unfavourable, unfavourable variations are eliminated. Favourable variations are inherited through generations.

5. Variations that are inherited through generations and repeated differently helped to form new species.

6. a) The theory of natural selection.

b. A- Struggle for existence

B- Those with no favourable variations

C- Natural selection

D-Accumulation of variations inherited through generations.

GENERAL EDUCATION DEPARTMENT

SAMAGRA SHIKSHA, KERALA