

LIFE PROCESSES^{1.}

Life Process: All the process/functions which are important to maintain a life.

Basis of Living Being

- Made up of cells.
- Follow level of organisation.
- Follow nutrition process.
- Occur growth & development.
- They do locomotion (Movement.)
- Response to the environment.
- In living organism occur Metabolism.

Metabolism: Chemical reaction taking place inside the organism.

- Do respiration.

Eg: Nutrition, Respiration, Transportation, Excretion, Reproduction.

Nutrition

- ↳ It is the process in which living organism takes/procure food (nutrients).
- It is a Biochemical and Physiological process in which we use the food to support our life.

Nutrients

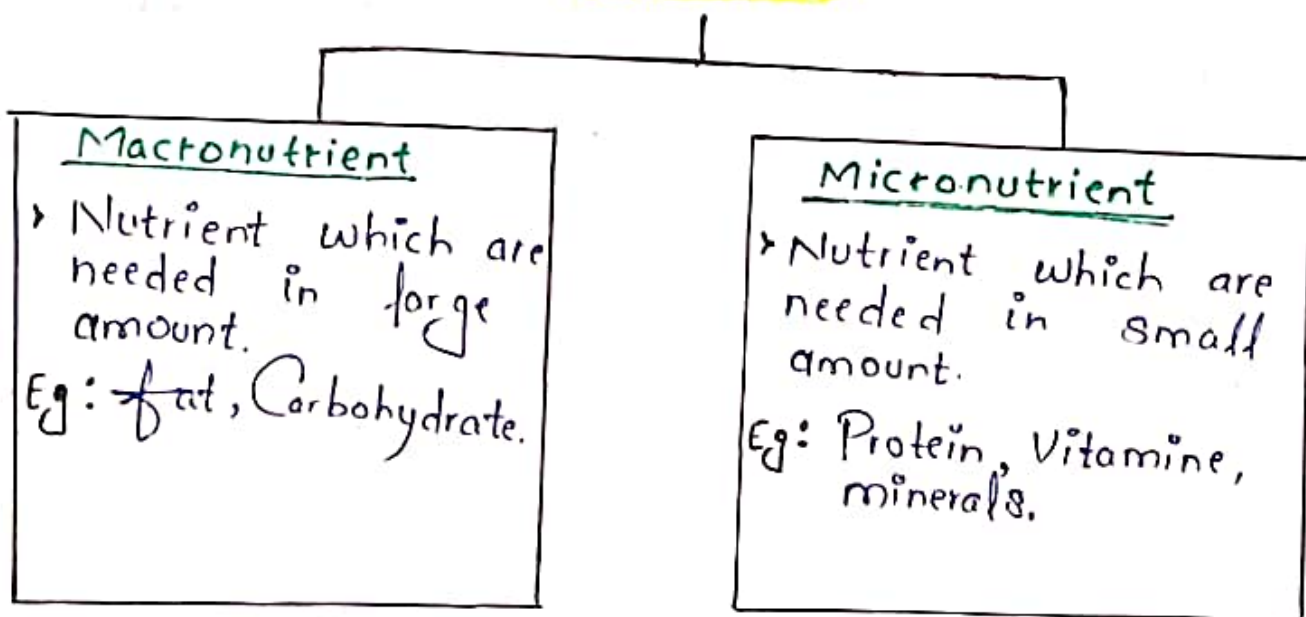
↳ Nutrients is a chemical compound which is present in our food which helps our body to grow and perform function.

There are five Important Nutrients

- ↳ Fat, Source: Oily food, Energy giving food.
- ↳ Carbohydrate, Source: Rice, Chapati, Energy giving food.
- ↳ Protein, Source: Egg, Soyabean, Pulses, body building food.
- ↳ Vitamin, Source: Fruits, Protective/disease resistance food.
- ↳ Mineral, Source: Milk (Fe, Na, K, Zn, P, Ca) Maintain metabolism.

There are two types of Nutrient

Nutrient



Mode of Nutrition In Different Organism ^{3.}

(i) Autotrophic Mode of Nutrition

(ii) Heterotrophic Mode of Nutrition

Autotrophic Mode of Nutrition

Autotrophs: That type of organism which make their own food by the process of photosynthesis.

The mode of nutrition which is followed by Autotrophs is called Autotrophic mode of Nutrition.

Autotrophs
Self → Nutrition

There are two types of Autotrophic Modes of Nutrition

Photo-Autotrophic

↳ That organism which ~~are~~ use sunlight from making their own food.

Eg: Plants

The mode of nutrition which is followed by photo Autotrophs is called Photo Autotrophic Mode of Nutrition.

Chemco-Autotrophic

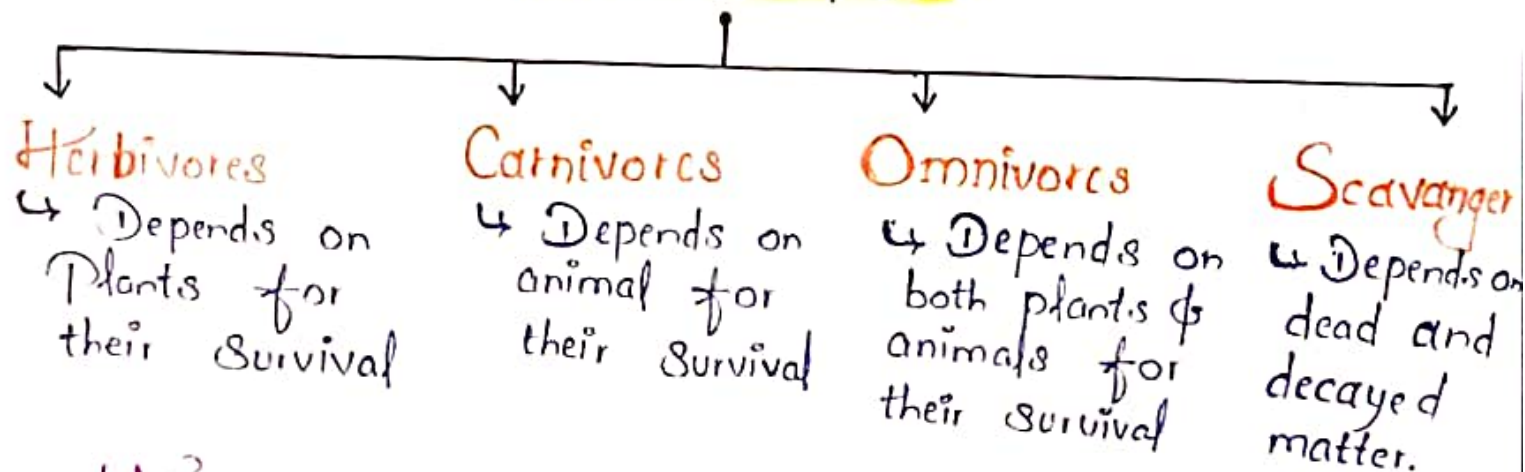
↳ That organism which use chemical for making their organic food.

Eg: Methano Bacteria

The mode of nutrition which is followed by Chemco Autotrophs is called Chemco Autotrophic mode of nutrition.

Heterotrophs are classified into following types ^{4.}
on the basis of their food habit.

Heterotrophs



Heterotrophic Nutrition

Heterotrophs: That organism which depends on other organism for their food.

The mode of nutrition which is followed by heterotrophs is called Heterotrophic mode of nutrition.

Heterotrophic Nutrition

① Saprophytic Nutrition

↳ The nutrition which is followed by saprophytes is called saprophytic nutrition.

Saprophytes: That organism which depends on dead and decayed matter for their food.

Mushroom, Fungi, Food is digested externally

(ii) Parasitic Nutrition

↳ Type of nutrition in which an organism obtain their food and shelter by living on another organism without killing it.

Parasites: That organism which obtain their food and shelter by living on another organism.

Host: Host is a organism on which parasites live.
Eg: Amarbel, Lice, Bed bug, Tapeworm.

Types of Parasites

* Endoparasites: Live inside the host body.
Eg: Tapeworm.

* Ectoparasites: Live on the surface of host.
Eg: Lice, Amarbel, Leech.

(iii) Holozoic Nutrition

↳ It is the process of nutrition in which organism swallow the food inside & a series of steps followed i.e. Ingestion, Digestion, Absorption, Assimilation, Egestion.

* Photosynthesis

→ It is a process in which green plants make their own food with help of CO_2 , H_2O , sunlight in the presence of chlorophyll.

Requirements for the Photosynthesis

(i) CO_2

Source: Plants get CO_2 from surrounding atmosphere with the help of stomatal pores.

(ii) H_2O

Source: Plants gets H_2O from soil with the help of roots.

(iii) Sunlight

Source: from Sun.

(iv) Chlorophyll

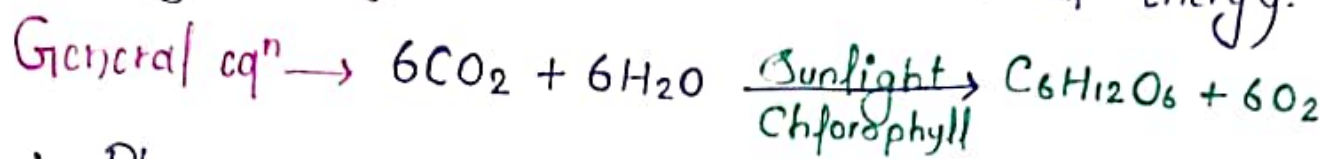
Source: from leaves/green stem (Most of the chlorophyll exist on the lower surface of leaves.)

* The cell of the leaves which contain chlorophyll is Callly mesophyll.

* Plants gets water from soil through the osmosis process.

Mechanism of Photosynthesis ^{7.}

→ Light energy converted into chemical energy.



→ Photosynthesis completes into two steps.

(i) Light Reaction (Sunlight needed)

> Chlorophyll absorb sunlight and break water (H_2O) into H_2 and O_2 .

> This H_2 is further used in Dark reaction.

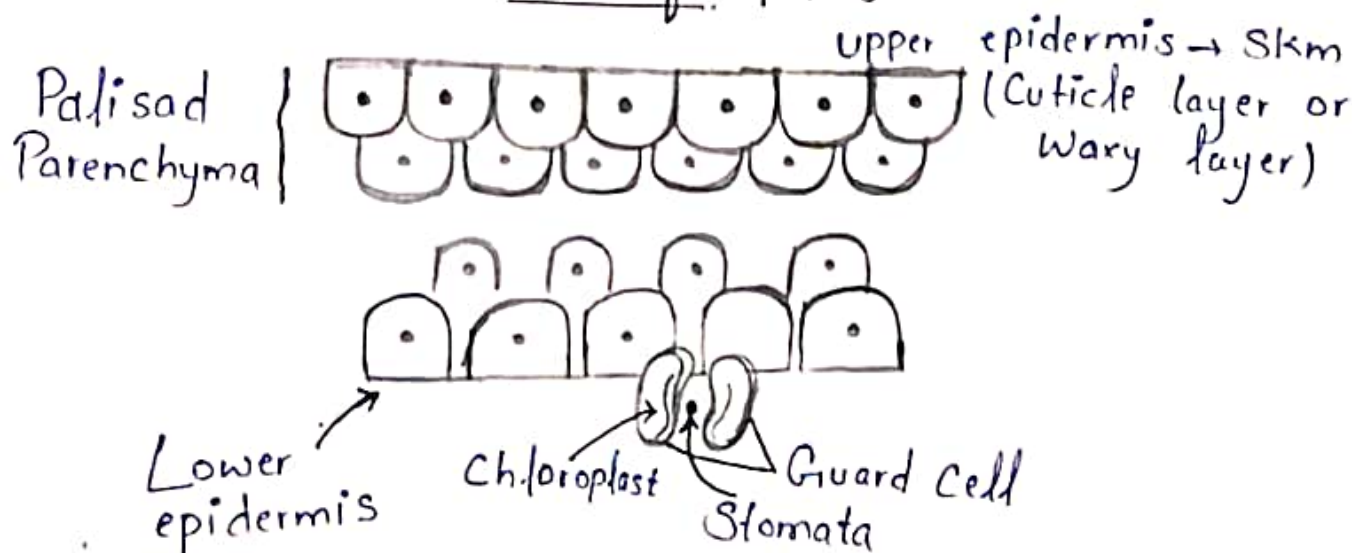
(ii) Dark Reaction (Sunlight not needed)

> Reduction of CO_2 by adding H_2 and formation of glucose.

Or, CO_2 is reduced into glucose by adding Hydrogen.



Section of leaves



Stomata and its functions

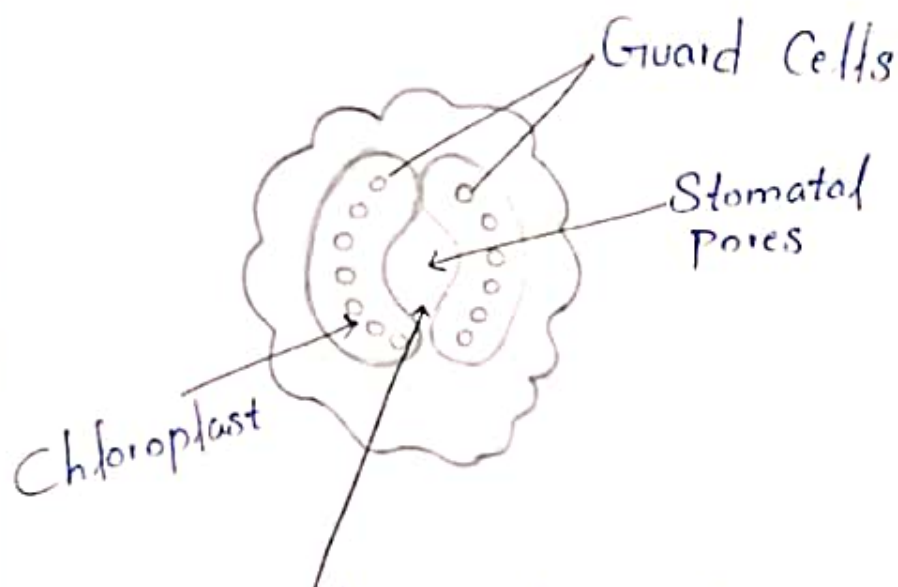
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↳ Stomata are the tiny Pores present on the surface of the leaves.

Functions of Stomata

↳ Exchange of gases O_2/CO_2

↳ Loses large amount of water (Water vapour) during transpiration.



opens when water enters
i.e. on swelling of
guard cells.



It closes when
water leaves shrinking
of guard cell.

* Guard Cell control the opening and closing of Stomata.

* Autotrophic mode of Nutrition.

9.

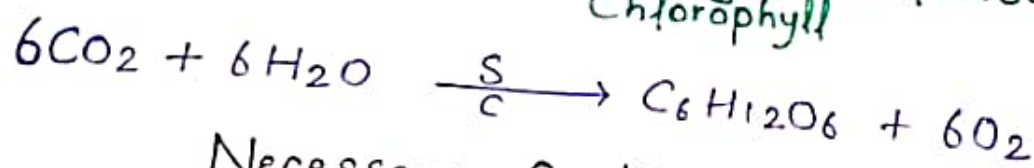
Autotrophs

↓
Photosynthesis

↓
Process performed by all green plants.

↓
It is a process in which green plants prepare their own food (glucose) by using CO_2 , water and sunlight in the presence of chlorophyll.

Carbon dioxide + Water $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ Glucose + Oxygen



Necessary Conditions

- Presence of CO_2
- Presence of H_2O
- Presence of Sunlight
- Presence of Chlorophyll

Q. Give the sequence of event which is involved in photosynthesis process.

→ Absorption of sunlight energy with the help of Chlorophyll in Mesophyll.

→ Sunlight energy are converted into chemical energy and decomposition of water into Hydrogen and Oxygen.

Dark reaction → Reduction of CO_2 with the help of hydrogen and formation of glucose.

→ CO_2 gets reduced into glucose with the help of H_2 gas.

① Sunlight ← absorbed ← Chlorophyll

② Sunlight → chemical energy
 $\text{H}_2\text{O} \rightarrow \text{H}_2 + \text{O}_2$

③ $\text{CO}_2 + \text{H}_2 \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$ → Stored in form of Starch in leaves.

Chloroplasts

→ Light reaction / light depended process → Thylakoid Membrane

→ Dark reaction / Calvin cycle → Stroma of chloroplast

→ We keep plants in dense room to destress the leaves before photosynthesis.

* Raw materials for photosynthesis

① Carbondioxide

→ Plants get CO_2 from surrounding air present in atmosphere.

→ By the help of Stomata.

Stomata

- It is a tiny pores which is present in the surface of leaves.
- The opening and closing of stomata takes place with the help of guard cells.

②. Water

- Plants get water from moist soil with the help of their root & root hairs by the process of osmosis.
- The absorbence of water are transported to the leaf with the help of Xylem tissue.
- Plants also gets nutrients such as Nitrogen and phosphorus from the soil.
 - Organic — CO_2 (used for making glucose)
 - Inorganic — Nitrogen (Compound) (for synthesis of protein)

③. Sunlight

- The plants trap the sunlight energy with the help of chlorophyll.

Chlorophyll

- It is a green pigment which is present in the leaf.

It is present in chloroplast of the leaf cell.

Mesophyll cell / Photosynthetic cell

* Site of photosynthesis

- Photosynthetic cell / Mesophyll in the site of photosynthesis.
- In chloroplast of Mesophyll.
 - thylakoid
 - Stroma

* Significance of photosynthesis

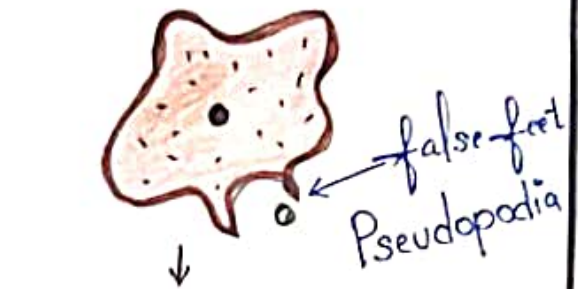
- : These are following significance of photosynthesis.
- (i) Photosynthesis helps in production of oxygen which is used by organisms for respiration.
 - (ii) Photosynthesis plays an important role in the foundation of food chain.
Because, most of the food chain initiates from plants directly.
 - (iii) Photosynthesis is responsible for Carbon cycle in our atmosphere.
 - (iv) It acts as energy storage.
 - (v) Helps in conversion of energy.
e.g: Light energy → Chemical energy → food energy with the help of dark reaction.

Nutrition in Amoeba (Unicellular eukaryotes) ^{true nucleus}

- ✓ Amoeba: Unicellular organism
- ✓ No fix Shape and Size.
- ✓ Amoeba feed microscopic plants or animals.

1. Ingestion

- Amoeba engulf the food with surrounding water.
- Amoeba engulf the food with false feet (pseudopodia).
- Food with surrounding water form food vacuole.
- The process through which Amoeba in take the food is called phagocytosis.



Food Vacuole: Temporary stomach

3. Absorption

- Digested food from food vacuole goes into cytoplasm of Amoeba.



4. Assimilation

- Nutrients used by the Amoeba for their growth.

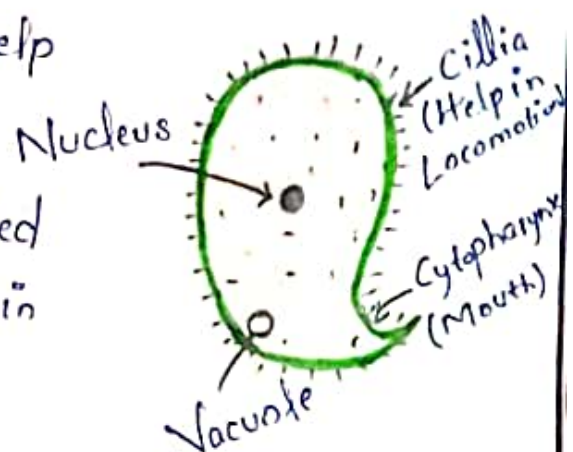


5. Egestion

- With the help of diffusion undigested waste released out from amoeba through cell membrane.

Nutrition in Paramecium (Unicellular eukaryotes)

- Ingestion of food with the help of mouth (Cytopharynx).
- Remaining all four steps completed in paramecium in same way as in Amoeba.



Nutrition in Humans

Humans follow Holozoic nutrition.

- Ingestion (Mouth)
- Digestion (Digestive System)
- Absorption (Small Intestine)
- Assimilation (Blood)
- Egestion (Anus)

Alimentary Canal.

- A long hollow tube like structure inside human body of approx 9m length
- It starts with mouth and ends with Anus.

Important structure involved in nutrition.

- 1) Mouth (Tongue + Teeth)
- 2) Oesophagus (food pipe)
- 3) Stomach (digestion of protein)
- 4) Small intestine (Jejunum, ileum, Duodenum)
- 5) Large intestine (Colon, Caecum, Rectum)
- 6) Anus

1) Mouth (Tongue + Teeth)

Teeth

• There are four types of teeth.

i) Incisors

- ↳ Helps in cutting of food.
- ↳ Lie in front of buccal cavity.
- ↳ Sharp & flat
- ↳ 8 in number

ii) Canine

- ↳ Helps in tearing of food.
- ↳ Present on either side of incisors.
- ↳ 4 in number.

iii) Premolars

- ↳ Flat and broad teeth.
- ↳ helps in grinding of food.
- ↳ Present on either side of canine.
- ↳ 8 in number - 4 in upper jaw, 4 in lower jaw.

iv) Molars

- ↳ More flattened and broader than premolar.
- ↳ helps in grinding of food.
- ↳ present on either sides of premolar.
- ↳ 12 in number - 6 in upper jaw, 6 in lower jaw.

Tongue

- ↳ Tongue is a soft, fleshy, muscular and movable organ.
- ↳ Present at the floor of buccal cavity.

Functions

- ↳ helps in speaking.
- ↳ Mixing saliva with food.
- ↳ Swallow of food.
- ↳ detects the taste of food (due to presence of taste buds)

Salivary Gland: Salivary gland is a type of gland which is responsible for secretion of saliva.

There are three types of Salivary gland.

- i) Parotid gland
- ii) Submandibular gland
- iii) Sublingual gland

Digestion begins in our mouth.

- ↳ Teeth - Physical digestion of food.
- ↳ Helps in chewing & Mastication.
- ↳ Break bigger particle into small particle.

* Tongue / Saliva

- ↳ Tongue mixes food with saliva.
- ↳ Saliva contains ptylin & Salivary amylase.
- ↳ Ptylin kills microbes. (Present in food)
- ↳ Salivary amylase digest starch in sucrose.

Starch $\xrightarrow{\text{Salivary amylase}}$ Sucrose

Bolus: After digestion in mouth food is called Bolus.

Oesophagus (Food Pipe)

- It is a hollow tube like structure which responsible for transport of food from mouth to stomach.
- A movement is called peristalsis takes place in oesophagus.
- Peristalsis: Regular contraction & relaxation of oesophagus (food pipe).

Stomach

- J shaped hollow bag like structure.
 - Thick-walled (stomach wall)
 - On stomach wall gastric gland exist, which give following secretion.
- (i) HCL: HCL change medium of food from Basic to acidic medium.
 - To activate pepsin enzyme.
 - Kill bacteria/microbes present in food (Bolus).
 - (ii) Pepsin: Pepsin digest the protein.
 - (iii) Mucus: Mucus is a jelly like soft fluid.
 - Protect stomach wall from corrosion of HCL.
- * Food stay in stomach for almost 3-3.5 hours.
 - * After digestion in stomach food is called chyme.

Small Intestine

- Length 6.25m long but less in cross section area.
- Part of alimentary canal i.e hollow tubular structure.
- Complete digestion takes place in small intestine.
- * Parts of small intestine.
 - i) Jejunum (Villi present)
 - ii) Duodenum (complete digestion)
 - iii) Ileum
- Small intestine receive the secretion of liver (bile) pancreatic juice.
- Small intestine releases intestinal juice.

Intestinal juice + Pancreatic juice + Bile.

→ Digestive juice.

* Liver (Bile)

- ✓ Liver secretes Bile.
- ✓ Bile is stored in gall bladder.
- ✓ Bile is yellowish (colourless chemical) which contain salt.
- ✓ It is basic in nature and help in changing food medium from acidic to basic.
- ✓ It emulsify fat globules. {emulsification: Breaking}

Heterotrophs stored energy in the form of glycogen.

Autotrophs stored energy in the form of starch.

Glycogen: The extra carbohydrate which is not used by body stored in liver is called glycogen.

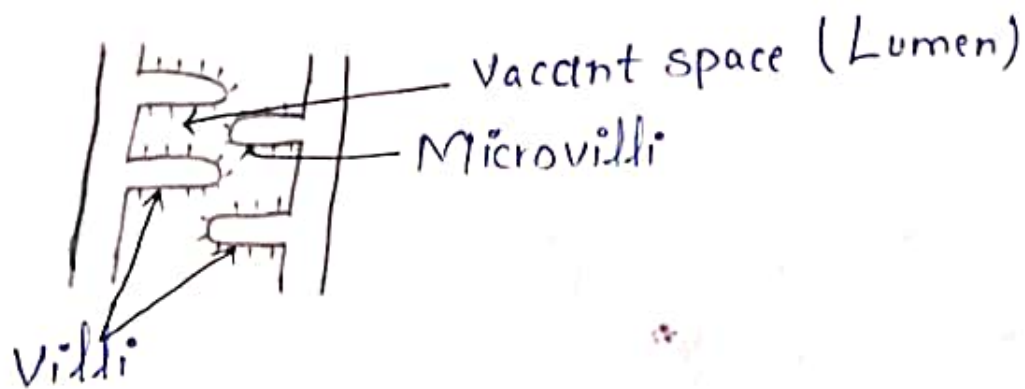
* Pancreas

↳ Pancreas secrete pancreatic juice which contains

- i) Trypsin: Digestion of protein & convert protein into Amino acid.
- ii) Pancreatic Amylase: Digestion of carbohydrates & convert into glucose.
- iii) Lipase: Digestion of fat & convert into fatty acid and glycerol.

Absorption

- ↳ It is a process in which digested/soluble/simpler food absorbed with the help of finger like projection Villi.
- ↳ On the wall of small intestine a large number of villi present.
- ↳ Villi finger like projection which increase surface area.
- ↳ Increased surface area help in better absorption of nutrients into blood.



* Assimilation

→ It is a process in which digested food transfer to each cell of body with the help of blood.

* Egestion

→ Large intestine absorb most of the water from undigested make it semi-solid slurry.

→ The undigested waste stored in rectum for sometime & released through Anus.

→ This process is called Absorption.

Parts of Large Intestine.

i) Colon

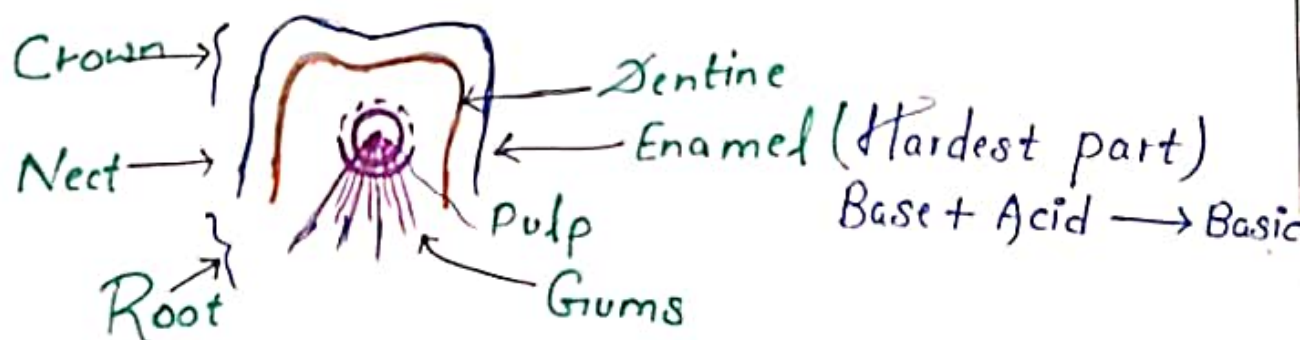
iii) Rectum

ii) Caecum

Dental Carries

: The abnormal problem of corrosion of teeth longer due to acid released by bacteria is called dental carries.

Solution: Hygiene and daily cleaning of mouth.



Digestive System

21.

