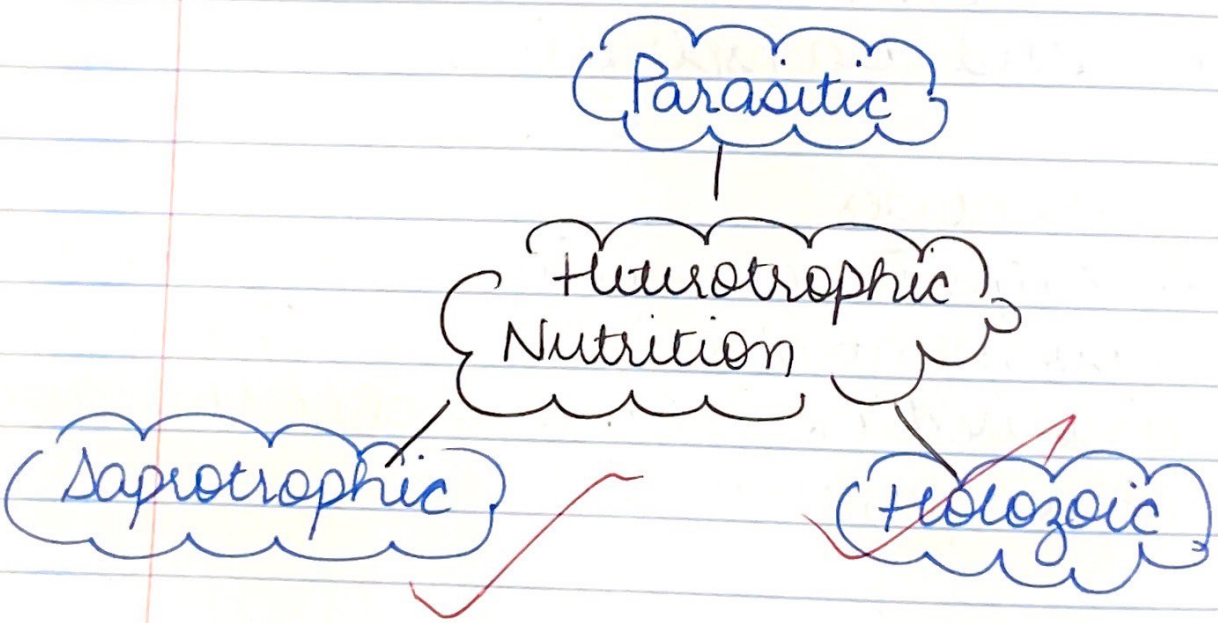
Heterotrophic mode of nutrition ⇒

→ In this mode of nutrition an organism takes readymade food from other organism



I. Parasitic :

- Organism obtains food from host and host may be harmed.
- When parasite stays inside the body it is called endoparasites

(tapeworm)

- When the parasite stays on the body it is called ectoparasites (leech)

II. Saprotrophic :

- They feed on dead and decaying matter

- They break complex matter in solution form.
  eg → fungi and some bacteria.

III. Holozoic :

- Whole organism is taken as food
- Complex organism is later on broken down into simpler substances.

- It involves five steps :
  Ingestion - taking in of food.
  Digestion - breakdown of food components.
  Absorption - absorption of essential
  Assimilation - absorption of energy
  Egestion - removal of waste material.

for eg → humans and amoeba, animals, paramoecium etc.

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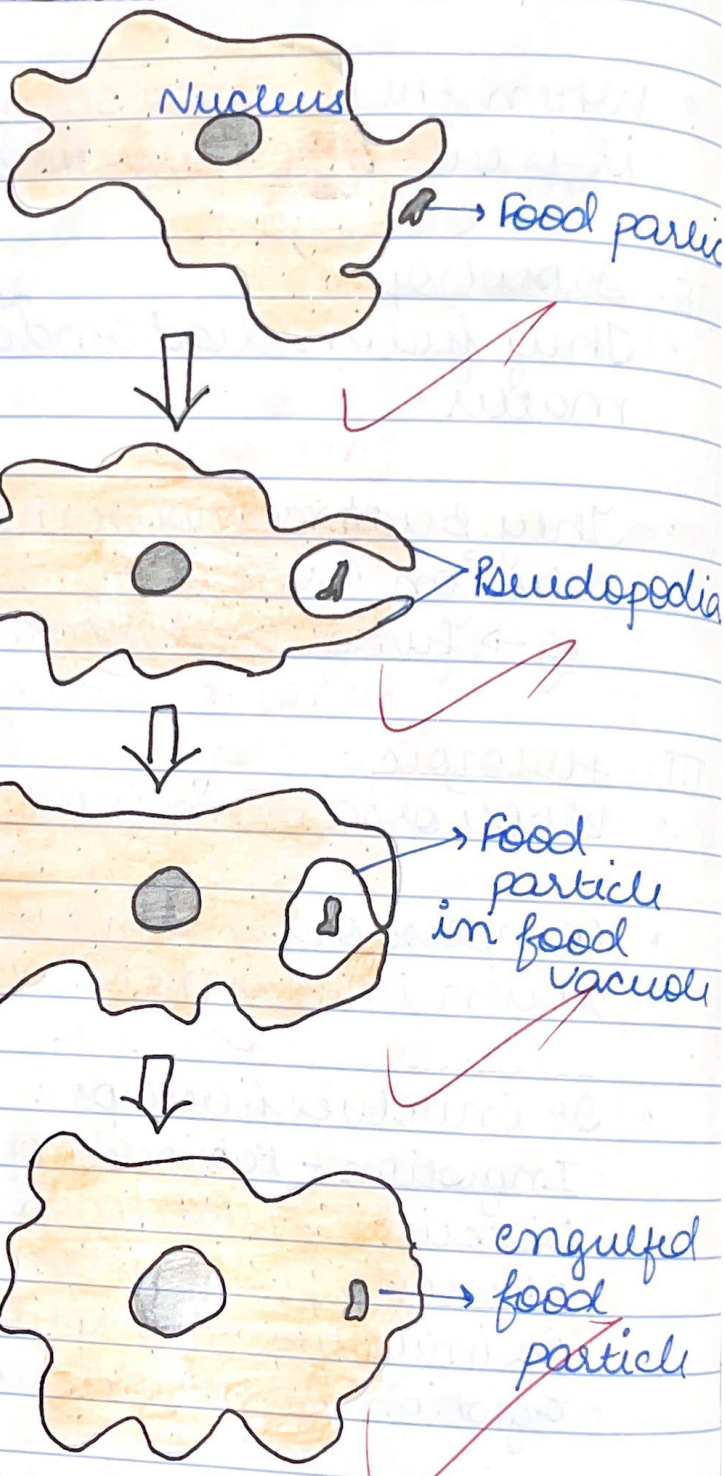
Nutrition in Amoeba ⇒



food

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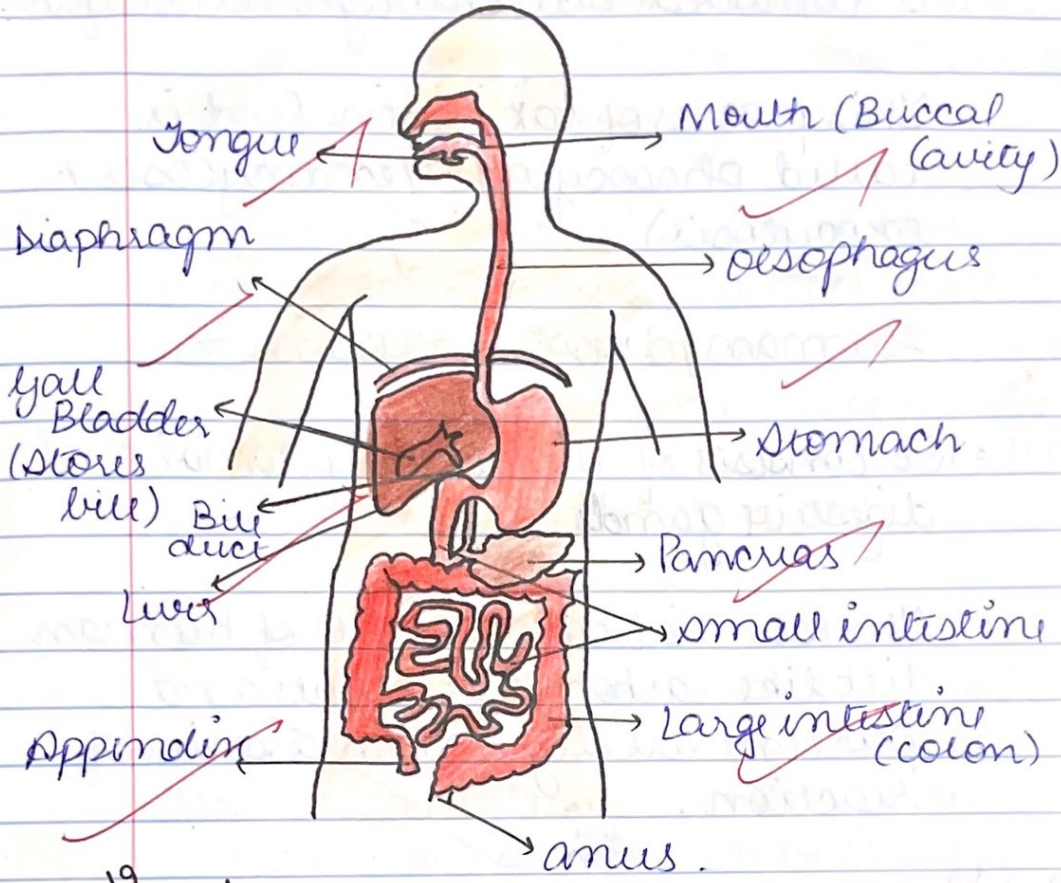
Human alimentary canal ⇒



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Nutrition in Amoeba ⇒

(refer diagram on prev pg)

- Amoeba takes in food using finger-like projections called pseudopodia which are present on the cell surface and fuse over with food particles forming a food vacuole.
- Inside the food vacuole, complex substances are broken down into simpler ones which diffuse into cytoplasm.

- The remaining undigested material is removed out through cell surface.

This process of taking in food is called phagocytosis (endocytosis + exocytosis)

Human digestive system ⇒

- It consists of alimentary canal and digestive glands.

- The essential components of human diet like carbohydrates, fats and proteins are digested in a series of reaction.

(refer diagram on prev page)

Shirita 28/3/19

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Steps of digestion in humans ⇒

1) **Ingestion** : (mouth and buccal cavity)
It is the passage for the intake of food.
Teeth - They help in mastication of food.
Tounge - It helps in (1) swallowing of food, (2) mixing of food with saliva. It also helps in (3) tasting of food (gustatory receptors.

Salivary glands :- three pairs of salivary glands are located in buccal cavity, release saliva containing enzymes like salivary amylase or ptyalin.

Oesophagus :- swallowed food travels through the oesophagus by peristaltic movement. (contraction and relaxation of cells of muscles present). The muscles in the wall of oesophagus allow the food to reach the stomach.

2) Digestion :

Buccal cavity :- Carbohydrates in food are partially digested by enzymes like salivary amylase present in saliva

Carbohydrates (starch) $\xrightarrow{\text{Salivary amylase}}$ Maltose.

Stomach :- C or J shaped muscular sac present on left side of abdomen. Digestion of food takes place here. Inner lining of stomach has gastric glands which release gastric juices that contains HCl, mucus, pepsin.

HCl → makes the medium acidic for activation of pepsin enzyme
→ also kills bacteria in swallowed food.

Mucus → protects stomach from coming in contact with HCl and pepsin enzyme.
Pepsin → it breaks down proteins into peptones in acidic medium

Proteins $\xrightarrow[\text{(acidic medium)}]{\text{pepsin}}$ Peptones

Small Intestine :- longest part of alimentary canal, narrow tube about 7 to 8 metres in length and is highly coiled.

** It is comparatively longer in herbivores as they have to digest cellulose.
Liver → largest gland in human body and releases bile juice (lacks enzymes) which is stored in gall bladder and contains bile pigments and salts.
Functions of Bile juice →
- It neutralises acids and makes medium alkaline or basic for pancreatic and intestinal enzymes.
- emulsification of fats — breaking

fats into small globules so as to increase enzyme efficiency.
Pancreas → present near small intestine and releases pancreatic juice containing enzymes like trypsin lipase and amylase

Digestion in small intestine →
- the exit of food from stomach is regulated by sphincter muscle which releases food in small amounts in small intestine.

- Pancreatic and intestinal enzymes bring about the complete digestion of food.

Maltose —amylase→ glucose
Peptones —trypsin→ amino acids
Lipids (fats) —lipase→ fatty acids + glycerol

3) Absorption :
Small intestine → Absorption occurs with the help of villi which are finger like projections present on the surface of cells of small intestine

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- They are richly supplied with blood vessels and increase the surface area for absorption of food components.

Large intestine → it is smaller (about 1.5 to 2 metres) and wider than small intestine.

- Absorption of water and some salts from undigested food takes place here

4) Assimilation:
- the absorbed food goes into the blood and moves along with blood streams from where the food reaches to the cells and is further utilised.
- digested food, mainly consists of glucose, fructose, fatty acids, amino acids etc.

5) Egestion
- Undigested food is temporarily stored in rectum in the form of solid faeces and is

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removed out through anus.

Tooth Decay →

It is the softening of enamel and cavity forming that reaches the roots. It occurs when bacteria grows on food particles especially sugars resulting into acids production. These acids act on enamel and cause its softening or demineralis-ation. Saliva is not able to reach the roots.

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