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Ls 2 Nutrition in Plants

⇒ Animals are heterotrophs because they cannot synthesize their own food. Such mode of nutrition is called Heterotrophic Nutrition

⇒ Process involved in Heterotrophic Nutrition

* Ingestion : Taking in food.
* Digestion : Breaking down complex food into simple form by enzymes.

⇒ Digestion is of two types :

1) Intercellular Digestion : The food particles are ingested into the cells and gets digested. Eg: Amoeba, Paramecium

2) Extracellular Digestion : Digestion of food particles outside the cell
Eg: Humans

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* Absorption : Digested nutrients are absorbed and transplanted.

* Assimilation : Utilizing the absorbed food.

* Egestion : Removal of Undigested food.

⇒ Nutrition in Unicellular Organisms :

1) Nutrition in Amoeba : Amoeba is an unicellular organisms which feeds on algae, bacteria and other micro-organisms.

* It ingests food particles by forming temprary finger like projections, Pseudopodia

* Food gets digested in food vacuole which contains digestive enzymes into soluble form.

* Soluble food is absorbed and assimilated by amoeba.

* Undigested food is expelled out of the body.

ii) Nutrition in Paramecium: Food is ingested by cilia through oral groove and then the mouth.

* Food is digested in the food vacuole by the digestive enzymes.

* Then the digested food gets absorbed and assimilated.

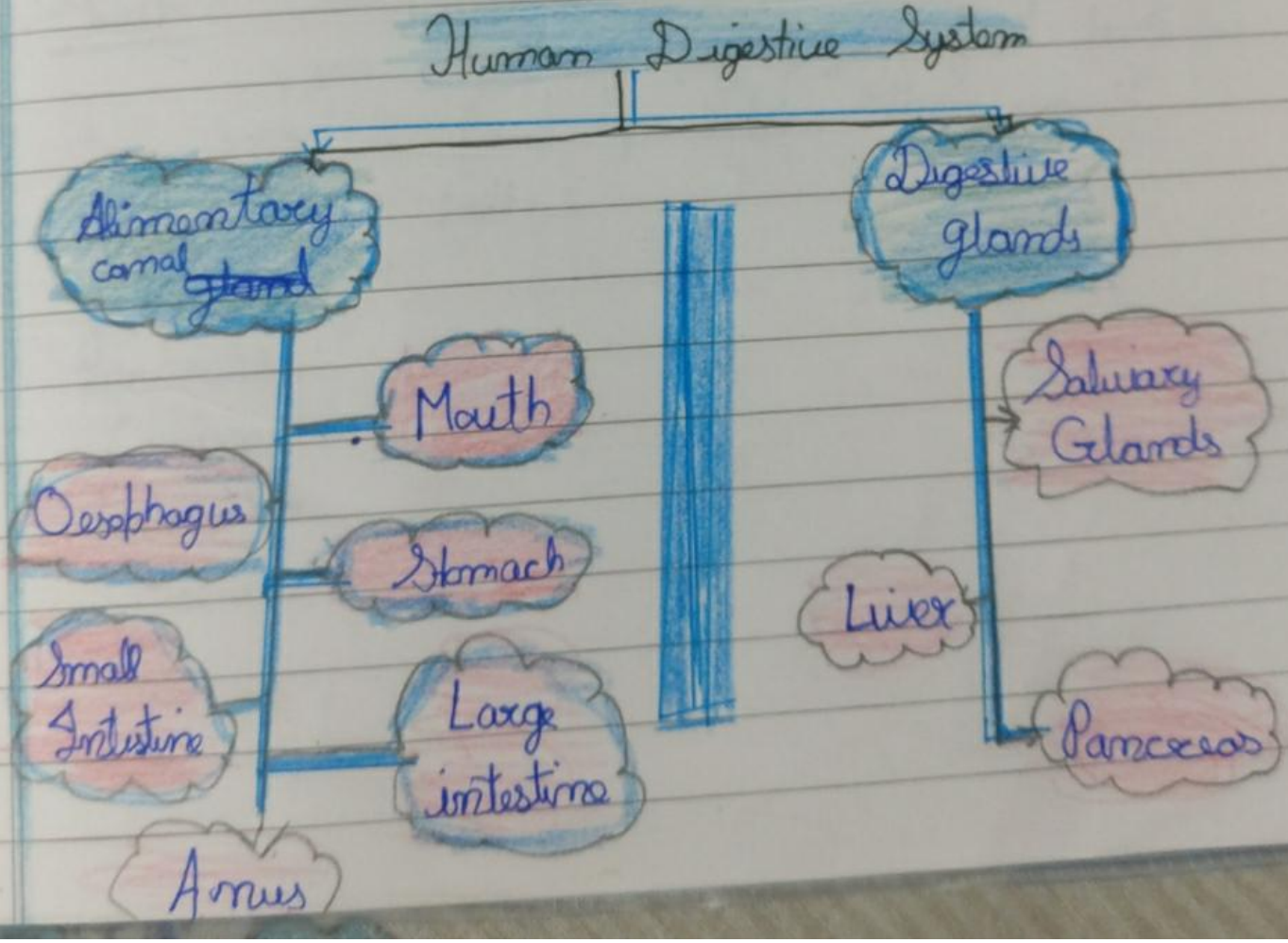
* undigested food is thrown out of the body.

=) Nutrition in multicellular organisms:

1) Hydra has a number of tentacles around its mouth, which are used for ingestion of food. The tentacles entangle small aquatic animals them with their stinging cells. Then push them into their mouth. Inside the body cavity the digestive juices secreted by the surrounding cells to help to digest the food. This is then absorbed and assimilated in the cells.

Sno.	Organisms	Food procuring organ
1	Amoeba	Pseudopodia
2	Paramecium	Cilia
3	Hydra	Tentacles
4	Spider	Jointed Appendages
5	Mosquito	Proboscis
6	Housefly	Feeding Tube
7	Butterfly	Proboscis
8	Frog	Sticky Tounge

→ Nutrition in Humans



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→ Digestive systems of humans consists of Alimentary canal and digestive glands.

I Mouth - Opening through which food is taken

* Tongue - It helps in mixing of food with saliva and swallowing of food

It also helps in tasting as it has Taste buds, Mastication and Speaking.

* Teeth - Structures in the mouth that help in breaking big sized food particles to smaller food particles. There are 4 types of teeth :

- Incissors
- Canines
- Premolars
- Molars.

* There are two sets of teeth

* Milk Teeth - Present in children from 0 to 5 years of age. These are 20 in number (10 in each jaw)

Permanent Teeth - Present throughout the life. These are 32 in number (16 in each jaw)

* Action of Bacteria on leftover food, specially sugary food # in the mouth, causes a buildup of acid and leads to tooth decay

→ Salivary glands - There are 3 pairs of salivary glands. They secrete saliva which contains an enzyme called Salivary.

Amylase / Ptylin

* These chewed food mixed with saliva forms reduced pulpy mass called Bolus

Starch —Ptyaline→ Maltase

* Saliva moistens the food and makes it easier to swallow

Pharynx is a common passage for digestive and Respiratory systems.

II. Oesophagus:- Connecting tube between the mouth and stomach.

* Muscles of oesophagus show wave like movement when food passes through it. The movement is called Peristalic movement/ Peristalsis

III. Stomach- J shaped muscular bag which mixes and churns the food

* Inner walls of stomach secrete juices which contain mucus, hydrochloric acid (HCL) and an enzyme Pepsin.

* Mucous protects the inner walls of the stomach from the action of HCL

* HCL kills the bacteria and germs in the food and provides an acidic for effective digestion.

* Pepsin digests protein into peptides

Proteins —Pepsin→ Peptides

IV. Small Intestine - Longest part of digestive system, coiled tube about 7m in length.

* Consists of 3 parts - Duodenum, Jejunum, Ileum

* Receives bile juices from liver, Pancreatic juice from pancreas and itself secretes intestinal juice which help in further digestion of food.

→ Liver - The largest gland that secretes bile juice.

Bile juice converts big morecules of fat into smaller morecules into smaller morecules. This process is called Emulsication

Big fat morecules $\xrightarrow[\text{emulsification}]{\text{Bile juice}}$ Small fat moreculs

* Pancrease: Secreates pancreatic juice which has 3 enzymes, Amylse, Trypsin and Lipase.

* Small intestine secretes intestinal juice which has enzymes that completely breakdown the nutrients into their respective simple substances

* Absorption: The ~~digestive~~ digested food is absorbed by the small intestine. The walls of small intestine has small finger like projections called

villi for absorption for food. Villi are richly supplied with blood capillaries.

Villi increase the surface area for absorption of food.

→ Assimilation - The absorbed food is transported by blood to all parts of the body to obtain energy. The utilization of the absorbed nutrients is called Assimilation.

V. Large Intestine - Consists of 3 parts:
* caecum
* rectum
* anus

Absorbs excess water and helps in removing solid undigested food through anus. This process is called Egestion

Glands

There are special organs in the body which produces digestive juices which help in breaking down of food called glands.

* **Salivary glands:** There are 3 pairs of salivary glands which help in secretion of Saliva containing Salivary amylase. Salivary amylase breaks down starch into sugar.

* **Liver:** It is the largest gland. It secretes bile juice which helps in emulsification (large fat molecules into smaller fat molecules). Gall bladder stores bile and releases bile into small intestine through the bile duct.

* **Pancreas:** It is the second largest and yellowish in colour. It secretes pancreatic juice which contain enzymes for breaking down of carbohydrates, proteins and fats.

⇒ Ruminant digestive system.

* Ruminant: Cud chewing animals are called Ruminants. Eg: Cows, horse, Camel, goat etc. These animals regurgitate their food. (bring back the swallowed food) up again to the mouth for chewing.

* Cud: Partially digested food is called cud.

* Rumination: The process in which cud is brought back into the mouth for rechewing and swallowing is called rumination.
  - They have special stomach for 4 chambers:
  * rumen
  * reticulum
  * omasum
  * abomasum.

* Rumen: Largest chamber that stores food. The swallowed food first goes here.

* Reticulum: It returns the cud back to the mouth which help in rumination.

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Omasum: Smallest chamber which absorbs excess water.

Abomasum: This is the true stomach where gastric juices are secreted to aid digestion. Here, complete digestion takes place. Absorption takes place in small intestine.