

Human Nutrition

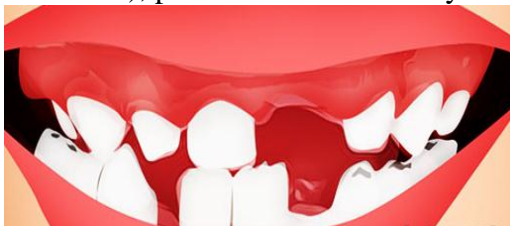
(IGCSE Biology Syllabus 2016-2018)

- **Balanced diet:** getting all the right nutrients in correct proportions
- Diet related to:
 - Age
 - Gender
 - Activity
 - Pregnant women
- **Malnutrition:** a condition caused by eating an unbalanced diet:
 - **Over-nutrition:** balanced diet but eating too much
 - **Under-nutrition:** having too little food
 - Eating foods in incorrect proportions
 - **Effect:**
 - (a) Coronary heart disease: eating too much fats which are rich in cholesterol – may lead to heart attack
 - (b) Constipation: lack of fibers in food because fibers are indigestible and form bulks. Friction between bulks and walls of intestine stimulate the peristalsis
 - (c) Obesity: eating too much fats and carbohydrates leads to their storage in the body and increase in body weight → heart attack, stroke, mobility impairment, high blood pressure

Nutrients	Uses
Carbohydrates	Energy
Fats	Energy, building materials, energy store, insulation, buoyancy, making hormones
Proteins	Energy, building materials, enzymes, haemoglobin, structural material (muscle), hormones, antibodies
Vitamin C	Protect cells from ageing, production of fibers
Vitamin D	Absorption of calcium
Calcium	Development and maintenance of strong bones and teeth
Iron	Making haemoglobin
Fiber	Provides bulk for faeces, helps peristalsis
Water	Chemical reaction, solvent

○ **Deficiencies**

- **Vitamin C:** scurvy (loss of teeth), pale skin and sunken eyes



- **Vitamin D:** rickets, weak bones and teeth
- **Calcium:** rickets, weak bones and teeth, also poor clotting of blood

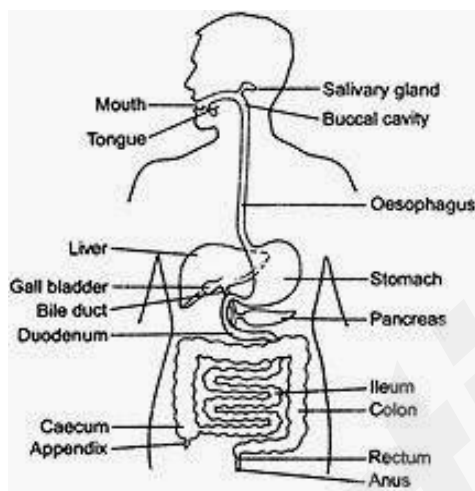


- **Iron:** anemia (less iron → less haemoglobin → less oxygen transported → less respiration → less energy)
- **Protein:** Kwashiorkor



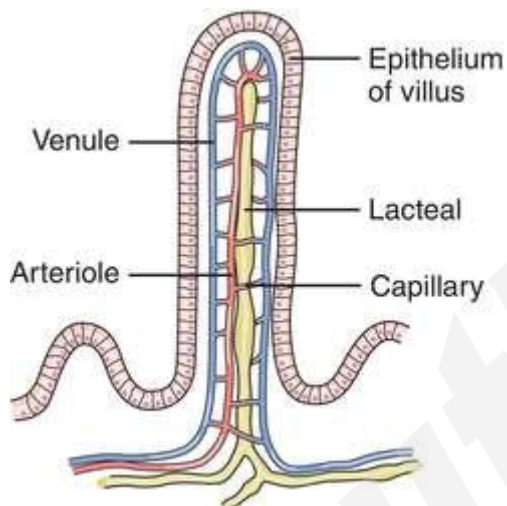
Human Alimentary Canal

- **Ingestion:** taking substances into the body through the mouth
- **Egestion:** passing out of food that has not been digested as faeces, through the anus
- **Digestion:** the breakdown of large, insoluble food molecules into small, water soluble molecules using mechanical and chemical processes



Organ	Features	Enzymes	Digestion
Mouth -Salivary gland: produces amylase	-pH: 7 (neutral) -contains teeth used for mechanical digestion	Amylase	Starch → maltose
Oesophagus	-tube-shaped organ which uses peristalsis to transport food from mouth to stomach	-	-
Stomach	-pH: 1 (acidic) -kill bacteria -elastic wall	Pepsin (a protease)	Proteins → peptides
Duodenum	-pH: 10 (alkaline) -liver produces bile salt → stores in gall bladder → bile salt emulsifies fat globules (to break down large oil droplet into small oil droplets, to increase the surface area for enzyme activity, also it neutralizes the acid from the stomach.)	Pancreatic juice: -carbohydrase / maltase -trypsin (a protease) -lipase	Maltose → glucose Peptide → amino acid Fat → fatty acids + glycerol

Absorption

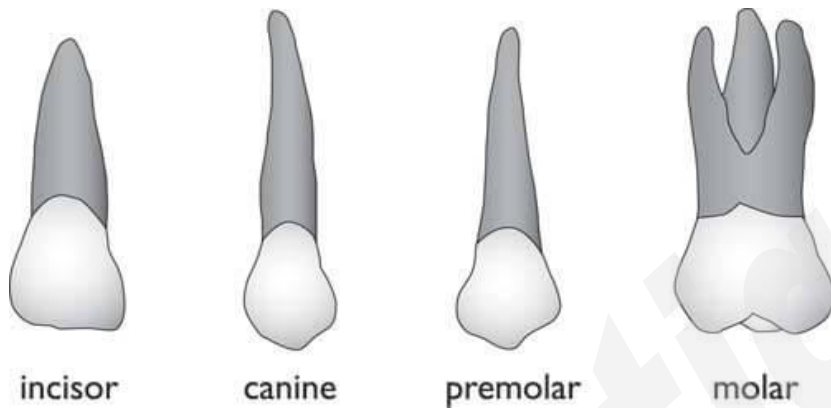


- **Absorption:** movement of digested food molecules through wall of the intestine into the blood or lymph
- **Ileum** (part of small intestine) is where absorption takes place
- The small intestine is folded into many villi which increase the surface area for absorption.
- More surface area → more absorption can happen
- **Epithelium:** only one cell thick for faster transport
- **Capillary:** transport glucose and amino acids
- **Hepatic portal vein:** delivers absorbed products to liver
- **Lacteal:** absorbs fatty acids and glycerol

Large intestine

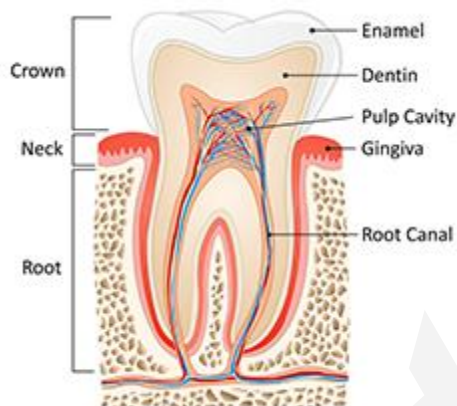
- Composed of 2 parts:
 - (a) Colon: absorption of minerals and vitamins, and reabsorbing water from waste to maintain body's water levels
 - (b) Rectum: where faeces temporarily stored

Teeth



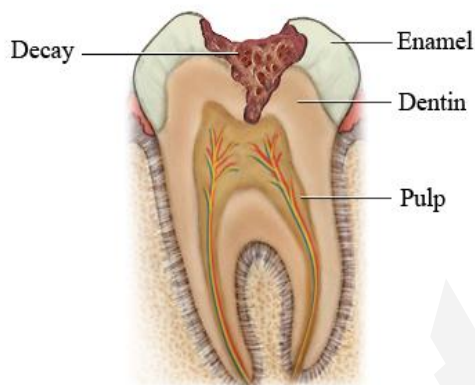
- **Incisor:** rectangular shape, sharp for cutting and biting
- **Canine:** sharp-pointed for holding and cutting
- **Premolar:** blunt for chewing and crushing
- **Molar:** chewing and crushing, two roots

Structure of a Tooth



Enamel	Strongest tissue in the body made from calcium salts
Root canal	Help to anchor teeth
Pulp cavity	Contains tooth-producing cells, blood vessels and nerve endings which detect pain
Dentine	Calcium salts deposited on a framework of collagen fibers
Neck	In between crown and root, it is the gums

Tooth Decay



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- Coating of bacteria and food on teeth
- The bacteria respire sugars in the food, producing acid which dissolves the enamel and dentine
- When the pulp cavity exposes → nerve exposes → toothache

Prevention

- Eating food with low sugar content
- Regular and effective teeth brushing to remove plaque