

Doggo Cheatsheet - Digestive System of Human

Stage	Part of Digestive System	Form of Food	Part of Organ	Functions	Digestive Juice	Enzyme/Chemicals	Function of Enzyme/Chemicals
Ingestion	Mouth Cavity	Food	Teeth	Chewing			
			Salivary glands	Produce saliva	Saliva	Salivary amylase	Starch → Maltose
		Bolus					
Digestion	Pharynx			Push food into oesophagus (instead of lung)			
	Oesophagus			Move food to stomach using peristalsis			
	Stomach		Cardiac sphincter	Controls the entry of food and prevents food from going back to oesophagus			
			Muscular wall	Churning			
			Gastric glands	Produce gastric juice	Gastric juice	HCl Pepsin	Kill bacteria & unfold (denature) proteins Proteins/peptides → smaller peptides
			Pyloric sphincter	Controls the exit from stomach to Duodenum			
		Chyme					
	Small Intestine		Duodenum	Receive bile and pancreatic juice, neutralized acidic chyme, lubricate and protect the mucosal layer of the small intestine			
			Liver	Produce bile	Bile	Bile Salt	Emulsify lipids into smaller droplets
			Gall bladder	Temporarily store bile			
			Bile duct	Release bile to duodenum			
			Pancreas	Produce pancreatic juice	Pancreatic juice	Pancreatic amylase Lipases Endopeptidases (e.g., trypsin, chymotrypsin) Exopeptidases (e.g., carboxypeptidases)	Starch → Maltose Lipids → Fatty acids + Monoglyceride Proteins/peptides → smaller peptides Proteins/peptides → smaller peptides and/or amino acids
			Pancreatic duct	Release pancreatic juice to duodenum			
			Wall of small intestine	Covered in villi and microvilli which contains different membrane-bound enzymes		Carbohydrases e.g., Maltase: Maltose → Glucose Sucrase: Sucrose → Glucose + Fructose Lactase: Lactose → Glucose + Galactose Exopeptidases (e.g., aminopeptidases, dipeptidases) e.g., Dipeptidases: Dipeptides → 2 amino acids	Disaccharide → Monosaccharide Proteins/peptides → smaller peptides and/or amino acids
		Chyle					
Assorption	Large intestine			Adaptation		Blood capillaries → Blood	Lacteal → Lymph
				Very long → sufficient time Finger-like projections called villi, which are further lined with even smaller extensions called microvilli → increase surface area for absorption Walls of the villi are only one cell thick → shorten distance for transport Each villus has a lacteal surrounded by a dense network of blood capillaries → steep concentration gradient Villi are in constant motion due to peristalsis → digested food molecule into close contact		Small, water-soluble molecules (e.g., monosaccharides, amino acids, minerals, water soluble vitamins) by diffusion and active transport Water by osmosis	Digested lipids and fat-soluble molecules
Egestion	Anus			Organ/Part of Organ	Functions		
				Colon	Absorb water, minerals and some vitamins from the remaining materials		
		Faeces		Organ/Part of Organ	Functions		
				Rectum	Temporarily store faeces		
				Anal sphincters	Control the removal of faeces through anus		

Mechanical Digestion	vs.	Chemical Digestion
A physical process that reduce the size of food (and increase surface area) without changing its chemical makeup		A chemical process that breaks molecular bonds to turn large complex food molecules into simple, usable nutrients
e.g., chewing, churning, peristalsis, bile salt emulsifying lipid		e.g., enzyme reactions

Endopeptidases	vs.	Exopeptidases
Break peptide bonds within the inner part of a polypeptide chain Result in 2 smaller peptides e.g., pepsin, trypsin, chymotrypsin		Break peptide bonds at the terminal ends of a peptide chain Release 1 free amino acid e.g., carboxypeptidases, aminopeptidases, dipeptidases
		Dipeptidases A type of exopeptidase that break down dipeptides into 2 amino acids



Assimilation

Hepatic portal vein → Liver → Hepatic vein → Inferior vena cava → Heart → other parts of the body	(inside wall of small intestine) 1. Fatty acids + monoglycerides → Triglycerides 2. Triglycerides + Cholesterol, lipoproteins and other lipids → Chylomicrons Lymph vessels → vein near the heart → Heart → other parts of the body Lipoprotein lipase breaks down triglycerides from chylomicrons and lipoproteins into fatty acids and glycerol for energy or fat storage
Monosaccharides Cells break down glucose to release usable energy (ATP)	
Amino acids New proteins, tissues, enzymes, hormones, antibodies, etc.	
Function of Liver - Convert galactose and fructose into glucose - Controls level of blood glucose - Store excess glucose as glycogen and lipid - Control the release of amino acids to blood - Synthesize certain proteins - Deaminate excess amino acids	Function of Liver - Clear Chylomicron remnant - Packages fats into lipoproteins - Storage of fat and fat-soluble vitamin