

Assessment Feedback Sheet

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Module Code: SHSS4068

Module: The Science of Nutrition

Personal Evaluation – to support your academic progress please complete the section below BEFORE submitting your work.									
What do you consider to be the best aspects of this work?									
Which aspects do you consider could have been improved in this piece of work?	Putting sentences together								
What have you found most satisfying whilst undertaking this submission?	Understanding the process of digestion more								
ASSESSMENT CRITERIA	Learning Outcome	GRADE							
		Poor 0-25%	Unsatisfactory 26-39%	Satisfactory 40 – 49%	Good 50 – 59%	Very Good 60 – 69%	Excellent 70 – 85%	Exceptional 86– 100%	%
Theoretical explanation	1								70%
Use and appropriateness of references	2								20%
Structure and flow of answer	1								10%
It is expected that students will present work that is proof read, correctly referenced and adheres to the Assessment Checklist . Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the checklist below .									
TUTOR COMMENTS:									
Submission date: via Turnitin		Return date: (at least within 4 weeks)		Tutor:			Mark:		

Describe the hormonal and enzyme regulation of the digestion process.

Leptin is a hormone that sends signals to the hypothalamus in the brain to trigger hunger response and regulate energy balance, it is produced by fat cells and released into the circulatory system by adipose tissue as a function of energy stores (Kerem et al., 2007). Ghrelin has many functions but the main purpose is to stimulate appetite and the release of growth hormone it is produced in the stomach and small intestines with a little bit of the hormone realised in the pancreas and brain (hormone.org, 2020). These hormones combined with the sight, smell and thought of food triggers the cephalic phase of appetite this activates the secretion of saliva in the mouth (Lean and Combet, 2017).

This is where the process of digestion starts as food is manipulated by the tongue and teeth are used to chew food into smaller particles breaking them into the vitamins and minerals we need (Tortora and Derrickson, 2014). Intrinsic sugars are released through biting and chewing; saliva gland which contains mucus and the enzyme amylase ptyalin, partially digests polysaccharides, moistens, lubricates and dissolves some of the food particles, whereas lingual lipase begins triacylglycerol digestion (Lean and Combet, 2017). Salivary amylase in the swallowed food continues to act until it is inactivated by stomach acids (Tortora and Derrickson, 2014).

There are four main gastrointestinal hormones that control the gastrointestinal system that are secreted mainly by the endocrine cells scattered throughout the epithelium of the stomach and small intestines. These include secretin, cholecystokinin (CCK), gastrin and glucose dependent insulinotrophic peptide (GIP) (Widmaier, Raff and Strang, 2014).

The stomach stores, dissolves and partially digests the macromolecules in food and regulates how fast contents pass on to the small intestines (Widmaier, Raff and Strang, 2014). The gastric mucosa contains cells in the stomach including the proteolytic enzyme zymogen pepsinogen, cells secreting the hormone gastrin and Hydrochloric acid which is secreted by the glands lining the stomach walls to dissolve the particulate matter in food, disrupting the structural framework of proteins to produce pepsin and to kill any microbes that may be left on food (Bender, 2017). Pepsin splits long protein chains into smaller polypeptides (Lean and Comber, 2017). Churning turns fats into an emulsion, a solution called chyme is the produced by the break-down of food particles such as polypeptides, droplets of fats, salt and water (Widmaier, Raff and Strang, 2014). Presence of food in the duodenum activates the hormone CCK and releases enterogastrones when fat is present (Lean and Combet, 2017). Little absorption occurs in the stomach as molecules can't cross the epithelium of the gastric wall (Bender, 2017).

Most Absorption occurs in the small intestines with the help of pancreatic juice, bile and intestinal juice (Whitcomb and Lowe, 2007). Pancreatic juice is slightly alkaline pH which inactivates pepsin from the stomach and perfect environment for the activity of enzymes in the small intestines (Tortora and Derrickson, 2014). The enzymes in the pancreatic juice include a starch-digesting enzyme called pancreatic amylase; protein- digestive enzymes that include trypsin, chymotrypsin, collaqqenase, elastase and carboxypeptidase secrete into the duodenum, splitting polypeptide chains at specific peptide bonds and remove amino acids (Lean and Combet, 2017). A triglyceride-digesting enzyme called pancreatic lipase and two nucleic acid enzymes called ribonuclease and deoxyribonuclease split nucleic acids into free mononucleotides (Whitcomb and Lowe, 2007). Upon reaching the small intestine, the

inactive form of trypsin is activated by an enzyme called enterokinase (Tortora and Derrickson, 2014).

Bile contains bicarbonate ions, cholesterol, phospholipids, bile pigments and organic wastes (Widemaier, Raff and Strang, 2014). Free fatty acids aid the bile salts in emulsification, these fats are insoluble in water and their solubilization increases the rate at which they are digested and absorbed (Wideramair, Raff and Strang, 2014). Bile is secreted and synthesized by the liver into the small ducts that join to form the common hepatic duct; between meals the bile is stored in the gallbladder which concentrates the organic molecules in bile by absorbing salts and water (Bender, 2017). The liver produces bile acids from cholesterol and ileum bile acids reabsorb and pass into the blood back to the liver for re-secretion into the bile (Widemaier, Raff and Strang 2014).

Once digestion is completed in the small intestines the final products are ready for absorption (Tortora and Derrickson, 2014). Three enzymes located at the surface of the small intestinal absorptive cells complete the digestion of disaccharides breaking them down into monosaccharides which are small enough to be absorbed (Tortora and Derrickson, 2014). Aminopeptidases and tripeptidases split remaining peptides into pairs of single amino acids (Lean and Combet, 2017). Maltase splits maltose into two molecules of glucose, Sucrase breaks sucrose into glucose and fructose and Lactase digests lactose into a molecule of glucose and galactose (Tortora and Derrickson, 2014). These oligosaccharides are hydrolysed and expressed on the apical membrane of the epithelial cells that populate the small intestinal villi (Lanham-New et al., n.d.). During digestion of a meal a stationary contraction and relaxation of intestinal segments move towards the large intestines which produces a continuous division and subdivision of the intestinal contents, thoroughly mixing the chyme in the lumen and bringing into contact with the intestinal wall; the intensity of segmentation can be altered by hormones (Lean and Combet, 2017).

Active transport is used in large intestines for the transportation of sodium from the lumen to the blood with the accompanying osmotic absorption of water and movement of bicarbonate ions into the lumen (Wideramir, Raff and Strang, 2014). The large intestines lack digestive enzymes and consist mostly of mucus and fluid containing bicarbonate and potassium ions, storing and concentrate fecal material before defecation (Bender, 2017).

Word count: 940

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