

Answering questions concerning biochemistry

[Science](#), [Chemistry](#)



Question 1

Whole wheat bread contains the carbohydrates amylose and amylopectin, which form starch. It also contains fiber, which is completely indigestible and goes through the GI tract undigested, i. e. unable to be broken down by an enzyme. Starch, conversely, is digested in the mouth by the enzyme salivary amylase into maltose. Digestion continues in the duodenum by the enzyme maltase, which breaks the maltose into glucose, and absorption of the monosaccharide glucose happens in the small intestines. Sodium ions aid in the absorption of glucose. Yoghurt contains fats, sugars (sucrose) and milk proteins (casein). Milk proteins are digested in the stomach and duodenum by proteolytic enzymes into peptides and finally amino acids that are absorbed in the small intestines. Bile salts emulsify fats after which pancreatic lipase breaks them into fatty acids and glycerol molecules that are absorbed in the ileum. The sucrose is broken down into glucose and fructose in the duodenum by enzyme sucrase, and the monosaccharides are absorbed in the ileum (Digestion and absorption, n. d.). Apples and carrots contain vitamins and mineral salts, which do not undergo digestion but are directly absorbed into the small intestines.

Question 2

Oxidative phosphorylation takes electrons from these molecules and transfers them to oxygen, making ATP in the process. This process occurs in the mitochondria. NADH and FADH₂ are oxidized into NAD⁺ and FAD, whereas oxygen is reduced by H⁺ ions into the water. NAD-linked dehydrogenases remove electrons from substrates to NAD in reversible reactions. The malate-aspartate shuttle or the alpha-glycerol phosphate

shuttle convey electrons from NADH outside the mitochondria (the two complexes involved in the process). Blood supplies oxygen to the process.