**Human Physiology**  
**Vocabulary list - 4**

**exocrine gland** – a gland that releases secretions outside an outer epithelial layer (Note: the space on the outside of an outer epithelium could still be within the body, such as the space within the gut tube.)

**pyloric sphincter**

**amylase** – an enzyme that catalyzes the breakdown of a glucose polymer called starch into maltose—the disaccharide composed of two glucose molecules. It is secreted by salivary glands and pancreas in response to the presence of food.

**protease** – an enzyme that catalyzes the breakdown of proteins or polypeptides into smaller peptides.

**peptidase**

**pepsinogen** – the inactive precursor to the protease called pepsin. It is formed in the chief cells of the stomach’s epithelium and is converted to pepsin by the action of hydrochloric acid.

**lipase** – the enzyme that catalyzes the breakdown of triglycerides (or triacylglycerols) into fatty acids and glycerol.

**bile salts** – chemical modifications of cholesterol that interact with both lipids and water (due to the addition of more polar and charged groups). They are produced by the liver and secreted into the small intestine where they help emulsify dietary fats.

**hepatic portal system** – the circulatory arrangement where the capillaries surrounding the small intestine drain into the portal vein that carries blood directly into the liver. As a consequence, the nutrients (and toxins) absorbed into the bloodstream move first past hepatic (liver) cells where they can be absorbed, stored, chemically modified, or excreted.

**gluconeogenesis** – the chemical pathway that converts certain noncarbohydrate molecules, such as specific amino acids or lactate, into glucose molecules.

**lipogenesis**

**ketogenesis** – the chemical pathway within hepatic cells that converts fatty acids into some smaller water-soluble molecules, known collectively as ketone bodies, that can be readily used to generate ATP in other cells.

**ketone bodies**

**glycogenesis** – the chemical pathway that strings glucose molecules together to form a glucose polymer known as glycogen—the molecular arrangement used by animals to store glucose after meals.

**glycogenolysis**

**apolipoprotein** – the term used to describe a protein that is normally attached to a second molecule other than a polypeptide. For example, an apolipoprotein is a protein that normally attaches to lipids.

**chylomicrons** – water-soluble packages or droplets containing dietary triglycerides, cholesterol, phospholipids, and one copy of apolipoprotein B-48 (along with potentially other apolipoproteins picked up in circulation) that are synthesized in the endothelial cells of the small intestine, and enter general circulation through the lymphatic system.

**VLDLs (very low density lipoproteins)** – water-soluble packages or droplets containing either dietary or liver-synthesized triglycerides, cholesterol, phospholipids, and one copy of apolipoprotein B-100 (along with potentially other apolipoproteins picked up in circulation) that are used to transport these different forms of lipids from the liver to other body cells.

**LDLs**

**HDLs**

**enteric nervous system** – a subdivision of the peripheral nervous system involved in the control of smooth muscle contractions and digestive secretions along the gastrointestinal system (gut tube). It is capable of coordinating many different gastrointestinal responses on its own, but it also it receives considerable innervation from the autonomic nervous system and thus is often considered a part of it.

**myenteric plexus** – the portion of the enteric nervous system that lies between the two smooth muscle layers surrounding the gut tube.

**submucosal plexus**

**vagus nerve** – the only paired cranial nerve that starts in the brainstem (within the medulla oblongata) and extends down below the head, to the neck, chest and abdomen. Along with being a pathway for sensory visceral input into the CNS, it is the route by which preganglionic parasympathetic fibers reach the heart, bronchioles, and gut tube all the way from the neck down to the middle of the large intestine (the second segment of the transverse colon). (Note: It is also the pathway by which motor neurons reach certain neck skeletal muscles.)
gastrin – the hormone released from G-cells located at the base (or antrum) of the stomach in response to decreasing acidity of stomach contents that stimulates parietal cells (located in other parts of the stomach) to secrete more H ions (that is, it stimulates gastric acid secretion).

CCK (cholecystokinin) – a hormone released from I-cells located along the early part of the small intestine in response to detection of protein and fat that stimulates the pancreas to release digestive enzymes. (It also appears to play a role in the feeling of satiation after a meal.)

secretin – a hormone released from S-cells located along the early part of the small intestine in response to intestinal contents being too acidic that stimulates bicarbonate secretion (in the pancreas and perhaps the Brunner’s gland.)

GIP (glucose-dependent insulinotropic peptide)

GLP-1 (glucagon-like peptide-1)

insulin – a hormone released by pancreatic beta cells largely in response to increasing blood glucose levels (as well as some of other factors) that promotes the absorption of glucose and amino acids from the plasma into cells (especially adipose and resting skeletal muscle cells), along with turning on a variety of enzymes involved in storage and growth.

glucagon – a hormone released by pancreatic alpha cells in response to lower blood glucose levels that stimulates liver cells to increase the release of glucose from storage (glycogenolysis) and synthesize new glucose molecules from noncarbohydrate precursors (gluconeogenesis), as well as stimulating adipose cells to release fatty acids from storage (lipolysis).

cortisol

parathyroid hormone – a hormone released from the parathyroid gland in response to decreasing blood calcium levels that acts to reverse this trend by (directly or indirectly) increasing: (1) the release of calcium ions from storage in bones, (2) the absorption of calcium ions in the small intestines, and (3) the reabsorption of calcium ions from kidney filtrate.

1,25-OH, Vitamin D, (1,25-dihydroxycalciferol or calcitriol) – the active form of vitamin D whose synthesis is controlled by the presence of parathyroid hormone, and that promotes the absorption of more calcium from gut contents within small intestine.

innate immunity

keratin

lysozyme – an enzyme found in saliva, tears, and sweat that can disrupt the function of certain types of bacteria by splitting sugars off their (peptidoglycan) cell wall.

leukocyte – a general term for all the different types of white blood cells

macrophages – a form of white blood cell that develop from monocytes to become phagocytic cells that take up positions throughout the body (as sentries). Once detecting entering bacteria (or other types of invaders) they both engulf them and release chemical signals that trigger a local inflammatory response.

neutrophils – a form of white blood cell found in circulation that responds to inflammatory signals and is able to phagocytize pathogens (among other things), release toxic molecules, and release other chemical signals.

chemotaxis

complement system – a set of plasma proteins that act together to remove certain forms of pathogens within interstitial space. It works by either coating a pathogen with proteins that facilitate removal by phagocytes or by killing the pathogen directly (by punching holes in cell membranes via the membrane attach complex).

C3 convertase – the enzyme complex that catalyzes a crucial step in complement activation—the deposition of large numbers of C3 molecules on a cell’s surface, which tags the cell for removal by phagocytes or starts the assembly of the membrane attach complex.

opsonization – the conversion of pathogens that are potentially unrecognizable by phagocytic cells (e.g., macrophages, neutrophils), into ones that can be recognized by coating or tagging them with a protein (such as C3b or antibodies).

mast cells – large white blood cells found in connective tissue through the body that respond to certain chemicals by releasing a variety of signal molecules including histamine (which leads to vasodilation and increasing permeability of local blood vessels).

cytokines – proteins made by one type of cell that influence the behavior or development of other cells. (Note: cytokines made by leucocytes are commonly called interleukins (IL), even though name is now somewhat misleading due to the fact that many interleukins have been found to be produced by a wide variety of body cells.)

interferons – cytokines that generally induce cells to resist viral replication by shutting down protein synthesis.

natural killer cells

apoptosis

eosinophils

acquired immunity
lymphocytes
clonal expansion
antigen – any small peptide presented by an MHC receptor, which, as a consequence, can potentially stimulate an acquired immune response. (Note: the word originated from the notion of being something that could stimulate antibody generation. It is now known, however, that an antigen can stimulate other forms of acquired immune responses besides antibody production.)

antigen-presenting cell – a cell that specializes in degrading proteins and then presenting small peptides (antigens) on MHC receptors in a way that can potentially initiate an acquired immune response.

Class II MHC – a form of cell surface receptor found only on antigen-presenting cells that presents antigens from proteins brought in from the outside of the cell via endocytosis (phagocytosis).

Class I MHC – a form of cell surface receptor found on nearly all types of body cells that presents antigens from proteins produced within the cell presenting them.

CD4 T cell

CD8 T cell

B cell

antibodies – a group of protein structures that originally start as cell surface receptors on B cells with hypervariable binding sites (thus antibodies on different B cells will tend to bind with different molecules). However, once a B cell becomes activated (undergoes clonal expansion and differentiation in plasma cells) numerous copies of this B cell’s specific antibody are secreted into interstitial space, where they can bind with whatever invading organism (or other structure) played a role in triggering this instance of B cell activation.

plasma cell – the cell type that an activated B cell turns into once it goes through clonal expansion and differentiation. Each plasma cell specializes in the production and secretion of a specific type of antibody.

thymus

SRY gene – the gender-determining gene found on mammalian Y chromosomes that codes for a protein that steers development towards becoming male.

growth hormone

IGF-1 (insulin-like growth factor-1)

hCG (human chorionic gonadotropin) – a peptide hormone produced by the developing placenta and released into maternal circulation that acts to prevent the disintegration of the corpus luteum and thereby maintain maternal progesterone production for longer than would occur otherwise. (Progesterone in turn acts to allow the placenta and embryo to continue to develop by maintaining the endometrial lining of the uterus.)

hCS (human chorionic somatomammotropin) – a peptide hormone produced by the developing placenta and released into maternal circulation that acts to block the actions of maternal produced insulin, and thus potentially increases the glucose (and other nutrient) supply available to the developing embryo/fetus.

prolactin – a peptide hormone released from the anterior pituitary associated with lactation (among other things). For instance, during breastfeeding the act of an infant suckling a nipple stimulates maternal production of prolactin, which in turn stimulates lactogenesis (milk production) in preparation for the next feed.