

What Happens When A Foreign Substance Enters The Body?

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1: When a foreign substance enters the body, often the body must take protective action.

Any foreign substance, i.e., molecular structure or a molecule recognized by the human immune system, is called an antigen. Antigens usually bind antigen-specific receptors that include T cell receptors and multiple antibodies. Multiple biological molecules like proteins, peptides and polysaccharides are building blocks of antigens. Meanwhile, antibodies, part of the immune system, are directly secreted into human blood and mucosa. At these specific sites, antibodies identify and bind foreign agents and substances, such as pathogens (harmful bacteria or viruses) and toxins. In this context, antibodies destroy these agents, as in the case of bacteria, antibodies engulf bacterial cells by lysis process after activating the complement system. However, an antigen-antibody reaction or interaction is solely a chemical interaction between antigens and antibodies during an immune reaction. In this context, B cells of the white blood cells produce antibodies. Such a reaction is accomplished in two phases. The first phase is sensitization, where the antibody sensitizes it by binding it, while the second phase is the agglutination process, where the combination of antigen and antibody takes place.

Furthermore, T and B lymphocytes are the main types of lymphocytes that are specific to their immune response in the human body. In this context, the bone marrow and Thymus are the main parts of the immune system from where T and B lymphocytes originate. B lymphocytes remain in the bone marrow and mature there or in lymph nodes, while T lymphocytes move to the Thymus and mature there. As far as their function is concerned, B cells are usually responsible for antibody production and attack invading agents like viruses, toxins or bacteria. However, T cells protect the human body from infections and also fight cancer in the long run. Further, suppose the T cell is not regulated properly. In that case, it poses severe infection, especially complex viral infections leading to respiratory disorders, diarrhoea, erythrodermata rashes and eczematous. Moreover, such malfunction may lead to chronic inflammatory diseases by preventing the body's autoimmune system.

2: Inflammation has a very vital function in

homeostasis

The inflammation's first purpose is to respond by healing the severely injured body parts through the vascular response to prevent infections. The second purpose is repairing and regeneration by removing the damaged cells and preventing the spreading of infection. Meanwhile, the final purpose is maturation, where effector cells control the infected part and infected cells by repairing the damaged ones. These effector cells are activated by the innate immune system of the human body. However, healthy inflammation is complex biological responsive behaviour where body cells and tissues respond to harmful agents like pathogens, irritants and damaged tissues. It happens when such inflammatory tissues move towards the injured place of the human body. It involves the protection of injured sites with the help of immune cells, molecular mediators and blood capillaries. However, if such inflammatory tissues are prolonged for more time, it may lead to chronic inflammation, which ultimately produces health issues like arthritis (Kraynak et al., 2018).

Furthermore, the immune response is the possible protection system of the human body, where the body recognizes and fights foreign invaders like bacteria, pathogens, toxic chemicals, viruses, etc. Such a response finally leads to the destruction of such harmful agents, i.e. antigens. However, inflammation takes place when the effect of such agents injures tissues and body parts such as toxins, bacteria and other agents. The injured part releases a chemical that leads to swelling and ultimately protects body tissues from such foreign agents.

3: Cellular damage can be classified as reversible or irreversible.

In hydropic swelling, two electrolytes are involved: sodium ion (Na^+) and potassium ion (K^+). Neurons of the human body utilize these two electrolytes to communicate with respective cell sites like skeletal muscles. However, one type of irreparable cellular damage is necrosis. It is the death of body cells, usually due to very little blood flow to these cells or tissues. Various causing agents, such as a toxic chemical reaction, injury, radiation, etc., may lead to such a condition. Necrosis is a process that cannot be reversed once the respective body tissue is damaged. However, if such a shrunken blood supply continues and large tissue areas die, such circumstances lead to gangrene conditions in the human body (Tonnus et al., 2019).

4: Figure 4.6 of your textbook depicts a normal cell and five adaptive processes the body takes as a

response to physiological stress.

Typically, the main trigger for metaplasia is environmental stimuli. Usually, such stimuli act in the context of the harmful effects of inflammation and various microorganisms. Metaplasia poses less risk of cancer in the human body as it is a reversible transformation in cellular change. However, Gastric intestinal metaplasia increases the risk of cancer in the human body as the chronic inflammation of the oesophagus leads to cellular changes in the tissues and stomach mucosa. It ultimately increases the risk of cancer.

Furthermore, metaplasia is the transformation of cells from one form to another because of external stimuli. These transformations are reversible and pose less risk of cancer. However, dysplasia is the abnormal transformation of cells, usually because of internal stimuli. It is an irreversible transformation and often leads to high cancer risk. However, apoptosis is a type of cell death where the body relinquishes abnormal and unneeded cells. In this aspect, loss of such apoptotic control tends to cause cancer cells to accumulate mutations for more time during tumour progression. It leads to angiogenesis in the case of abnormal cells or cancer parts. In other words, it reduces the risk of cancer and dysplasia in the long run.

5: Critical Thinking Exercise: President Lincoln is suspected to have had Marfan Syndrome. The Marfan Foundation website exists to educate and provide support to the lay public on genetic connective tissue disease. It is written to provide education and hope for those associated with the disease. It is written to provide education and hope for those associated with the disease. Click on and review the information under the Cardiovascular tab in the Key Features section of the website. (To find this section, click on “Key Features” in the red menu bar.) Note the careful

wording of the information so that individuals with varying levels of medical knowledge can understand the content. Then, in a brief paragraph, explain the risks associated with using these types of sources written for the lay public when completing academic assignments.

Such knowledge and medical content can impose lasting impacts and pose severe risks in a multidimensional way. For example, there is a risk of gathering irrelevant and unreliable information relating to any specific case, especially in the case of assignment completion. Similarly, unnecessary worry and stress occur when one has no expert-level knowledge about the disease. In addition, it may lead to self-diagnosis and treatment that can be fatal in the long run. Completing assignments with such stuff may also raise the question of authenticity from case to case.

References

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