Pernicious Anemia Case Study

Name

Institution

**Abstract**

Several components make up the digestive system. Teri has been diagnosed with Pernicious Anemia due to the antigens in her body attacking her Parietal cells and destroying them. As a result, Teri lacks the secretion of intrinsic factors and hydrochloric acid to absorb vitamin B12. Additionally, hydrochloric acid is missing that pepsinogen isn't activated in her body. Teri, therefore, has an abnormal red blood cell structure producing low oxygen levels in her body, triggering "***Erythropoiesis***.”

**Introduction**

The digestive system is made up of several organs that include the stomach and small intestine. This system assists in the absorption and processing of foods and water. It is essential to note that digestion is vital because it helps in breaking down food into nutrients. On the other hand, the immune system has a vital role since it protects the body from dangerous factors, including germs. While the immune system functions property one is considered healthy, but its failure could lead to serious illness. Finally, the cardiovascular system provides enough blood circulation through the body hence plays a vital role in the supply of oxygen to organs in the body, including the brain. After a series of tests and confirmation of the results, Teri is diagnosed with Pernicious Anemia. The human body is unable to produce enough healthy red blood cells since vitamin B12 isn't enough.

**Lacking Substance**

The Parietal cell is regarded as an oxygen cell found in the stomach wall. A significant role of these cells is that they secrete Hydrochloric acid that assists in the digestion of food. Consequently, the destruction of parental cells implies the inability to absorb Vitamin B12, which was the leading cause of Teri's Anemia. It is essential to note that parental cell antibodies are associated with Pernicious Anemia. The cells are vital for the secretion of hydrochloric acid, which absorbs Vitamin B12, necessary for erythropoiesis. The destruction of parental cells leads to little or no secretion of hydrochloric acid, thus the inability to absorb vitamin B12 (South Tees, n, d). Teri, therefore, lacks Intrinsic factors and Hydrochloric acid secretion, which therefore doesn't absorb Vitamin B12 that is also a lacking substance in her body.

**Correlation**

Parietal cells are also regarded as oxygen cells that produce intrinsic factors and hydrochloric acid. Pernicious Anemia is a condition often caused by the reduction of vitamin B12. The destruction of parietal cells will lead to the limited secretion of hydrochloric acid, limiting vitamin B12. Hydrochloric acid secretion is, therefore, a vital factor since it absorbs vitamin B12. Thus, the limited production of intrinsic factors results in vitamin B12 deficiency (Merchant, 2018). Intrinsic factors absorb vitamin B12; hence if parental cells are destroyed, it will lead to low production of intrinsic factors, which will result in insufficient absorption of vitamin B12.

**Lack of Pepsin**

Teri’s condition is that she suffers from Pernicious Anemia. As a result, she lacks pepsin since her parental cells have been destroyed. Since parietal cells secrete hydrochloric acid, it is essential to note that hydrochloric acid activates pepsinogen, breaking down protein and assisting indigestion. Therefore, Teri lacks pepsin because her parietal cells don't secret enough hydrochloric acid, which doesn't activate pepsinogen.

**RBCs level and Appearance**

If Teri were healthy, then she would have a normal synthesis of a red blood cell. The normal count would be 4 to 6 million cells per mcL. Her red blood cells would be biconcave in shape with a flat center which implies that her red blood cells would look like a donut.

**Hematocrit**

This is regarded as the percentage volume contained by the red blood cells in the blood. It is always measured when a blood test is taken, and the normal count for men is between 40 to 50%, and for women, it is 36 to 44%.

**Low oxygen levels**

The kidney produces a hormone called Erythropoietin due to low oxygen levels; hence it assists in the production of red blood cells. Therefore, kidney cells are sensitive to low oxygen levels, and in response, they produce Erythropoietin that promotes the formation of the red blood cells (Britannica, n, d). The process is called “***Erythropoiesis***."

**Protein that transports oxygen**

Hemoglobin is the protein that transports oxygen. The protein has a quaternary structure meaning it consists of two pairs of different proteins. There are four subunits in the hemoglobin, with each having a polypeptide chain and a heme group.

**Antibody secretion**

Antibodies are produced by special white blood cells called B lymphocytes in the immune system to detect a foreign substance. The first function is that antibodies are secreted to inactivate foreign substances and protect the body from danger. Antibodies also destroy bacterial cells through a process called Lysis. Finally, antibodies facilitate phagocytosis (MBL Bio, n, d).

**Types of antibodies**

There are five types of antibodies. These include; **IgG**, which is the most abundant type of antibody, and it also is the only isotope with the ability to pass through the placenta. **IgM** mainly circulates in the blood and has a lower affinity of antigens compared to IgG. The third is **IgA** which is abundant in breast milk, saliva, and mucus. It also forms dimers after its secretion. The fourth is **IgD** which accounts for about 1% of human immunoglobulins and is present on B cells surfaces. The last is **IgE** that makes up more than 0.001% of human immunoglobulins, and it is mainly involved in allergy (MBL Bio, n, d).

**Structure of Immunoglobin**

The Immunoglobulins are a member of the immunoglobulin super-family that consist mainly of two light chains (L) and two heavy chains (H). both chains are linked using a Disulphide bond covalently. Both chains have retreated structural units (Schroeder & Cavacini, 2010).

**Conclusion**

From the analysis above, it is essential to note that Teri's condition has led to the inadequate production of intrinsic factors and hydrochloric acid, limiting the absorption of vitamin B12 in the body. Teri, therefore, lacks pepsin which gives her body an abnormal count of red blood cells. As a result, Teri is said to have an abnormal Hematocrit because she has large pale red blood cells as opposed to the normal donut-shaped red blood cells. Her antibodies are the cause of the problem because they mistakenly targeted parietal cells, thus destroying them in the process.

**References**

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