

Name _____ Per _____ Date _____

Resource - Immune Cells in Action (www.teachersdomain.com)

The immune system is a collection of molecules, cells, and organs whose complex interactions form a defense network capable of protecting the body from organisms that cause disease. In general, the immune system can be divided into two distinct, though overlapping, subsystems: the innate system and the acquired system.

The innate immune system provides generalized protection against infection. Immune cells like the macrophages, for example, are very good at cleansing the body of invading organisms whenever they happen upon them. They have little ability to distinguish between self and non-self, however, and may engulf one of their own cells as readily as a foreign cell. These cells will also respond in the same manner no matter how many times they encounter a particular organism; in other words, they do not adapt and improve their effectiveness against previously encountered foes.

In contrast, the cells of the acquired immune system are able to distinguish foreign cells from self, and can distinguish between different types of foreign cells as well. In addition, some acquired immune system cells establish a "memory" for each invading organism they encounter. This is why for example, if you have fought off a certain type of infection -- like the mumps -- on one occasion, your body retains its ability to recognize and quickly mount a defense if subjected to that type of virus in the future.

Cells called lymphocytes are key to the acquired immune system response. There are two types of lymphocytes: B lymphocytes and T lymphocytes. These cells are always on the lookout for foreign cells. When they encounter them, B lymphocytes respond by producing antibodies -- large proteins that destroy or otherwise interfere with the vital activities of foreign cells. T lymphocytes, when they identify a target cell based on its chemical signature, either actively kill the invader using powerful chemicals, or secrete chemicals that attract macrophages that will eat the offending cell.

Importantly, B lymphocytes give rise to two types of daughter cells: plasma cells and memory cells. Plasma cells do little more than produce antibodies; however, they do so prolifically. A single plasma cell is capable of producing 30,000 antibody molecules each second. Memory cells also produce huge quantities of antibody molecules, but more important is their role in "immune memory." Memory cells are extremely long-lived and retain the ability to recognize and fight invaders they've seen before -- often for as long as the host organism remains alive.

Questions for Discussion

1. If our antibodies protect us from disease, then why do we keep getting colds?

2. In your opinion, how do you think vaccination works to protect you?