Innate Immunity

Innate Immunity is a non-specific type of immunity with which you are born. It recognizes highly conserved regions of foreign invaders, attempts to thwart their progress while the acquired immunity is built. Its components include:

Compliment system—involves a series of steps which result in six beneficial innate functions: 1. Inflammation. 2. Attraction of phagocytes via chemical signals. 3. Promotion of antigen attachment to phagocytes (enhancing opsonization in acquired immunity). 4. Lysis of invaders. 5. Activation of B-lymphocytes (stimulating the humoral response of acquired immunity). 6. Removal of harmful immune complexes.

Leukocytes

Mast cells—These are found in many different tissue types. They release many different substances that promote inflammation. They are important in defense against invaders; they release many different types of activating factors which stimulate other facets of the immune system.

Lymphocytes—(these mediate acquired immunity and most are found in the lymphoid tissue). There are three main populations of lymphocytes:

Natural Killer Cells—(which also function with the acquired immunity). These attack body cells that are infected with virus or cancer. They recognize surface proteins and release chemicals that trigger apoptosis. They kill cells presenting antibody molecules. They kill cells lacking MHC-I on their surface.

B-lymphocytes—which mediate humoral immunity.

T-lymphocytes—are responsible for cell mediated immunity.

Basophils—(1%) a leukocyte that releases histamine and prostaglandins to promote inflammation.

Monocytes—(2%-8%) give rise to macrophages and dendritic cells.

Phagocytes—the function by binding to invaders, engulfing them into a vacuole and fusing them with a lysosome.

Neutrophils—(70%) engulf and destroy microbes.

Eosinophils—(2%-4%) very abundant. Release enzymes to destroy invaders.

Dendritic cells—(5%) help elicit the primary immune response. These are antigen presenting cells which engulf microbes and stimulate the development of acquired immunity.

Macrophages—(5%) these are antigen presenting cells that stimulate acquired immunity after having engulfed an invader.

Inflammation—is an attempt by the body to restore and maintain homeostasis and occurs after injury. Inflammation causes an increase in the permeability of the surrounding capillaries and allows the various components of the immune system (mast cells, basophils, neutrophils) to infiltrate the tissue and attack any invader. Furthermore, this increased permeability of the capillaries allow substances of the plasma to enter the area of injury and stimulate the various mechanisms that promote healing.

Fever—(both local and general). Macrophages which become activated as the result of invasion release chemical factors that stimulate the anterior hypothalamus to produce prostaglandins which lead to an increase in body temperature (general fever). The fever will act to increase the rate of chemical reactions in the body and thus speeding up the removal of the invader. It will also act to elevate the body temperature above the optimum for growth of the invader.

