Trinity Allergy, Asthma and Immunology Care, P.C.
Natarajan Asokan, M.D.
Diplomate of American Board of Allergy & Immunology
3931 Stockton Hill Road, Suite D, Kingman, AZ 86409
Tel. 928-681-5800 Fax. 928-681-5801
1971 Highway 95, Bullhead City, AZ 86442 Tel. 928-758-6200
285 S. Lake Havasu Ave., Lake Havasu City, AZ 86403, Tel. 928-854-6800
www.trinityallergy.com

Know your immune system

Introduction

All of us get infections from time to time. Some infections such as common cold are minor, hardly requiring any treatment and your immune system takes care of them. Some infections such as spinal meningitis are severe enough to require hospitalization and even specialist care. Viruses and bacteria cause most of the infections. Parasites and fungi contribute to the rest. A child's immune system is naïve and is vulnerable to infections. As we get older, the immune system becomes more mature and develops the necessary arsenal to deal with infections. Initially it tries to contain the infection to the site of entry and subsequently eradicates it. In people with defective immunity, infections fail to localize and quickly spread to affect the whole body and may even result in death if not treated early and aggressively. In addition, people with defective immunity succumb to relatively weak disease causing germs, which usually do not affect normal people. Therefore, if you get infections often, get severe and life threatening infections or get infections from germs, which are not common causes of illness in normal people, then tests to rule out immunodeficiency, are in order.

Four arms of the immune system and role of antibodies

The immune system has four elements: antibody proteins, white blood cells, immune cells and complement proteins. The antibody proteins are of five types: Immunoglobulins G, A, M, E and D. Plasma cells that are specialized antibody making cells produce the Immunoglobulins. The immunoglobulin D's (IgD) role is ill defined at present and is not relevant to our present discussion. The immunoglobulin E (IgE) causes allergy and helps fight parasites. The immunoglobulin G (IgG) fights infections all over the body; the immunoglobulin M (IgM) fights infections in the blood and the immunoglobulin A (IgA) fights infections in the sinus and ear cavities, lungs, genitourinary and gastrointestinal tracts. The antibody proteins coat the bacteria on their outside and make them attractive for the white cells to swallow and kill them. They also help fix complement proteins on the walls of bacteria and kill the bacteria by creating holes on their surface coats. The body makes neutralizing antibodies against invading viruses that inactivate them. Following infection, initially the body makes IgM antibody proteins and subsequently IgG antibody proteins against the invading germs.

Since these antibody proteins are specific for each infection causing germ, by measuring them in your body fluids your doctor may be able to tell what type of infection you have and if the infection is old or new.

White blood cells

The bone marrow makes white blood cells that circulate in the blood. They zoom in to the site of infection, migrate outside the blood vessels, surround and kill the germs by swallowing them. If the bacterium is too large for them to swallow, several of these cells surround, fuse with other white cells to form a granuloma (like a castle), and effectively imprison the germ. Following infections, the white blood cell count often goes up and gives a clue that there is an active infection somewhere in the body. By following the white cell count closely, your doctor may be able to monitor the course of infection you may have.

Master cells of the immune system

The immune cells include lymphocytes and monocytes (types of white blood cells), macrophages (which are more effective than neutrophils in killing germs), plasma cells and reticuloendothelial cells. They form the backbone of the immune system. HIV effectively attacks the immune system by slowly destroying these cells. The lymphocytes regulate the function of immune system. They include B-lymphocytes and T-lymphocytes. When a disease-causing germ enters the body, the B-lymphocytes by transforming into plasma cells make antibody proteins with help from T-lymphocytes and macrophages. Initially the plasma cells make IgM and subsequently IgA or IgG antibody types. A specialized subset of lymphocytes known as cytotoxic and natural killer cells attack our own cells that harbor viruses (which otherwise would escape from the immune system) and destroy them. A smaller set of lymphocytes known as memory cells live long and help the immune system remember previous encounters with disease causing germs.

Complement proteins

The complement is a group of 20 proteins present in the blood that constitute primitive but effective arm of the immune system. They help fight infections by aiding the white blood cells and the antibody proteins. Unlike the antibody proteins, which need prior encounter with the germ before being able to fight it, the complement proteins can attack the germ on its very first encounter, thereby giving time for the rest of the immune system to gather forces and attack the invader.

In our next article, we will see how this process can fail and contribute to ill health and even death in affected individuals.

About the author:

Natarajan Asokan, M.D., F.A.A.P. is a board certified allergist and immunologist and a board certified pediatrician with over 25 years of experience as a physician and 7 years of experience as a practicing allergist & immunologist. He treats adults and children with various allergy & immunology problems. He

can be reached at 1739, Beverly Ave, Suite 118, Kingman, AZ 86409, Tel: 928-681-5800, Fax: 928-681-5801, or www.trinityallergy.com