The importance of a balanced immune system

When out of balance, the immune system not only fails to protect the body but can even attack it, mistaking ‘self’ cells for invading pathogens, resulting in debilitating autoimmune diseases such as lupus and rheumatoid arthritis.

The immune system is key to human health and is defined as “the bodily system that protects the body from foreign substances, cells, and tissues.” Allergies can result when the immune system mistakes an innocuous particle (such as pollen) for an invading parasite. In addition, years of chronic low-level inflammation, another indicator of an out-of-balance immune system, can contribute to diseases such as cancer and cardiovascular disease.

The immune system is also very sensitive to stresses of normal life - travel, personal problems, strenuous exercise, and change in diet can all cause imbalances in the immune system and affect overall health.

Generally, the immune system is described as having two parts. The innate and adaptive immune responses. The innate system is the more primitive and less specific. However, from an evolutionary perspective it is quite complex and sophisticated. It is the body’s first line of defense against foreign substances that may lead to disease.

The adaptive system, found only in vertebrates, is a much more specific, delayed response and requires action from the innate system to be initiated. Though considered separate, each interacts with the other in critical and complex ways. A rudimentary understanding of both responses helps to explain and further substantiate the importance of immune balance.

**INNATE IMMUNE RESPONSES**

The innate system consists of many parts. It includes physical barriers to infection, such as the skin and mucous membranes. In addition, there are chemical barriers, such as acidic environments that kill cells or prevent their growth, and enzymes, like lysozyme found in tears, that destroy bacterial cells.

The complement system, which is a group of serum proteins, is also an important part of innate immunity that can kill pathogens directly (lysis) or mark them (opsonisation) for later destruction (phagocytosis) by certain immune cells. These immune cells, called phagocytes, are also an integral part of the innate response that acts by internalising and killing pathogens. Importantly, these same cells are also able to produce chemical signaling proteins called cytokines and chemokines that have important effects on both the innate and adaptive systems.

**ADAPTIVE IMMUNE RESPONSES**

The adaptive response is a delayed response and is dependent on the innate system for activation. Although initially a delayed response, the adaptive system has memory, and the second time the body is exposed to the same pathogen, the response is almost immediate. The main cells in the adaptive response are T lymphocytes and B lymphocytes. Most T cells are either cytotoxic T lymphocytes (CTLs) or T helper cells (TH cells). CTLs can recognise virus-infected cells and kill them. TH cells serve to activate other cells in the immune system by producing cytokines. These can help promote an inflammatory response (supporting innate immunity) and can also support an adaptive response by activation of B cells.

It should be noted that there are different subsets of TH cells, their classification is dependent on the types of cytokines secreted. Major subsets include TH1 cells, TH2 cells and TREG cells. For example, when TH1 cells dominate, the body is better able to...
defend against bacteria and viruses, and when TH2 cells dominate, the cells are better able to defend against parasitic and mucosal infections. A well-balanced immune system will recognise and give the proper response to an immune challenge.

B cells produce antibodies (immunoglobulins). These are proteins that are very specific for a particular antigen (a molecule or part of a molecule). When the antibody binds the antigen on a pathogen, the pathogen can be destroyed. To become effective, T and B cells must first interact with the specific antigen. There are several types of antibodies expressed by B cells. The type of antibody produced is influenced by cytokines.

**IMMUNE BALANCE**

An underactive or weakened immune system will expose the body to increased susceptibility to infections and disease. Many things can weaken the immune system, including common everyday physical or emotional stress (Segerstrom and Miller, 2004). Secondary bacterial infections are possible during colds of viral origin since the immune system can be compromised by certain viruses. Biological agents can harm the immune system by killing off T helper cells (also called CD4 cells). UV light can suppress the immune system, resulting in greater susceptibility to cancers (Moodycliffe et al., 2000).

There are a host of pharmaceuticals and nutraceuticals developed and sold as immune boosters. It is generally believed that the immune system should not stay in a constant state of stimulation such as would occur through prolonged, daily use. In discussing the need for achieving immunobalance in a recent paper, Percival and Milner stated: “By lowering cancer risk with excessive supplementation use, there may be ill consequences. Thus, it is conceivable that whereas cancer risk may be reduced, the risk of other diseases may be increased. For example, over stimulated T cells may enhance the pathology associated with inflammatory bowel disease,” (Percival and Milner, 2005).

Logically, this concern may extend to sufferers of allergies, autoimmune and other inflammatory conditions.

The other side of the immune balance equation is an overactive or hyper-responsive immune system. Sufferers of autoimmune disease, inflammatory disease and allergies may benefit by suppressing their overactive immune response. A dysfunctional (overactive) immune system may result in allergies by mistaking harmless environmental substances such as pollen for an attacking parasite. In this case a stimulated TH2 response could cause B cells to increase antibody production (IgE) and cause an allergic response by interacting with mast cells, basophils and eosinophils, which in turn release histamine causing the allergic reaction (and the need for over-the-counter antihistamine products).

**HYGIENE HYPOTHESIS**

Why would the immune system become overactive and cause allergies? One widely accepted theory is called the ‘hygiene hypothesis’. This states that people growing up in today’s clean environment are not exposed to microorganisms as they were in decades past (and still are in third world nations, where allergies are much more rare).

Therefore, their immune systems have not been properly trained, allowing them to become stimulated inappropriately as adults. As stated in a recent article, “The induction of a robust anti-inflammatory regulatory network by persistent immune challenge offers a unifying explanation for the observed inverse association of many infections with allergic disorders” (Yazdanbakhsh et al., 2002).

**AUTOIMMUNE DISEASE**

Much worse, a dysfunctional immune system could recognise ‘self’ cells as foreign cells and initiate an attack. This would result in an autoimmune disease. Autoimmune diseases, sometimes called inflammatory diseases, are also caused by an overactive immune system that is out-of-balance. For example, when the immune system attacks the body’s joints, the result is rheumatoid arthritis (RA).

Immunosuppressant drugs are standard treatments for RA, but
may produce undesired side effects. Anti-inflammatory steroids are often prescribed to treat diseases such as asthma, arthritis and psoriasis.

Unfortunately, long-term use of corticosteroids is known to produce complications such as cataracts, weight gain, increased cholesterol and brittle bones. Even severe allergies may need long-term treatment with intranasal corticosteroids, although the potential complications and their severity are not as significant.

HEALTHY-LIVING STRATEGIES
The first line of defense is to choose a healthy lifestyle. Following general good-health will naturally keep patients' immune systems strong and healthy. Every part of the body, including your immune system, functions better when protected from environmental assaults and bolstered by healthy-living strategies such as:

• Don’t smoke.
• Eat a diet high in fruits, vegetables, and whole grains, and low in saturated fat.
• Exercise regularly.
• Maintain a healthy weight.
• Control your blood pressure.
• Drink alcohol only in moderation.
• Get adequate sleep.
• Take steps to avoid infection, such as washing your hands frequently and cooking meats thoroughly.
• Get regular medical screening tests for people in your age group and risk category.

AGE AND IMMUNITY
The ageing process somehow leads to a reduction of immune response capability, which in turn contributes to more infections, more inflammatory diseases, and more cancer. As life expectancy in developed countries has increased, so too has the incidence of age-related conditions.

While some people age healthily, the conclusion of many studies is that, compared with younger people, the elderly are more likely to contract infectious diseases and, even more importantly, more likely to die from them. Respiratory infections, influenza, and particularly pneumonia are a leading cause of death in people over 65 worldwide. No one knows for sure why this happens, but some scientists observe that this increased risk correlates with a decrease in T cells, possibly from the thymus atrophying with age and producing fewer T cells to fight off infection. Thymus function declines beginning at age 1. Whether this decrease in thymus function explains the drop in T cells or whether other changes play a role is not fully understood.

Others are interested in whether the bone marrow becomes less efficient at producing the stem cells that give rise to the cells of the immune system.

A reduction in immune response to infections has been demonstrated by older people’s response to vaccines. For example, studies of influenza vaccines have shown that for people over age 65, the vaccine is much less effective compared to healthy children (over age 2). But despite the reduction in efficacy, vaccinations for influenza and S. pneumoniae have significantly lowered the rates of sickness and death in older people when compared with no vaccination.

There appears to be a connection between nutrition and immunity in the elderly. A form of malnutrition that is surprisingly common even in affluent countries is known as micronutrient malnutrition. Micronutrient malnutrition, in which a person is deficient in some essential vitamins and trace minerals that are obtained from or supplemented by diet, can be common in the elderly. Older people tend to eat less and often have less variety in their diets.

One important question is whether dietary supplements may help older people maintain a healthier immune system. Older people should discuss this question with a physician who is well versed in geriatric nutrition, because while some dietary supplementation may be beneficial for older people, even small changes can have serious repercussions in this age group.

BALANCE, NOT BOOST
Therefore, there is a need to balance the immune system, not to boost or to suppress it. Natural products have a chance of maintaining balance in healthy individuals. Unfortunately, claims and research for nearly all natural products focus only on immune boosting.

The all-natural ingredient EpiCor® found in Immuno Armour, manufactured by Embria Health Sciences, LLC, has been clinically shown to balance the immune system. Multiple published human clinical studies show that EpiCor supports immune strength to help people live more healthier days.

In two randomised double-blinded, placebo-controlled human clinical trials, EpiCor reduced the incidence and duration of cold and flu symptoms (Moyad et al., 2008 and Moyad et al., 2010). A further study has shown that EpiCor has an effect on NK cell activation within two hours supporting a very rapid beneficial effect on the immune system (Jensen et al., 2011).

CONCLUSION
In summary, keeping the immune system in balance is crucial for maintaining health. The immune system is very complex and care should be taken to ensure it stays in balance. Ideally, one should lead a healthy lifestyle. A diet rich in vegetables, fruits and whole grains, while low in red meat and processed foods, should be the goal. This should be combined with regular exercise and reduced stress, and for those without optimal diets, nutritional supplementation.

References


The immune system is the body’s first line of defense against foreign substances that may lead to disease.