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

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**NATURAL KILLER CELLS**

Natural killer (NK) cells are another important part of the innate system. These cells are able to effectively target and kill viral-infected cells as well as tumour cells. The collective response of the innate system gives rise to inflammation at the site of infection. This is an example of ‘good’ inflammation, which promotes the activation of phagocytes and NK cells (enhancing their ability to kill pathogens) and transports them to the site of infection. The innate system is much more vast and complicated than described, but the above gives an indication of how the innate system works.

Natural killer (NK) cells are part of the adaptive immune system. They are effector lymphocytes of innate immunity endowed with constitutive cytolytic functions. More recently, a more nuanced view of NK cells has emerged. NK cells are now recognised to express a repertoire of activating and inhibitory receptors that is calibrated to ensure self-tolerance while allowing efficacy against assaults such as viral infection and tumor development. Moreover, NK cells do not react in an invariant manner but rather adapt to their environment. Finally, recent studies have unveiled that NK cells can also mount a form of antigen-specific immunologic memory. NK cells thus exhibit sophisticated biological functions that are attributes of both innate and adaptive immunity, blurring the functional borders between these two arms of the immune response.

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**Cellular Therapy**

Cells of the adaptive immune system hold a grudge: On re-encountering a pathogen, they show a robust protective response. It seems that natural killer cells of the innate immune system might also have this ability. Learning, a hallmark of life, produces adaptation to new information. The immune system, like the nervous system, has this ability to learn from previous experience - such as a single encounter with the many pathogens that exist.
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 Minter 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 Minter, 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 or 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...
AGED IMMUNITY

• strategies such as:

  • assaults and bolstered by healthy-living
  • when protected from environmental
  • gain, increased cholesterol and brittle
  • corticosteroids is known to produce
  • produced to treat diseases such as
  • may produce undesired side effects.
  • anti-inflammatory steroids are often
  • to dietary supplements may help older
  • the cells of the immune system.
  • that are obtained from or supplemented
  • can be common in the elderly.
  • one important question is whether
  • for nearly all, natural products
  • can have serious repercussions in
  • may produce undesired side effects.
  • anti-inflammatory steroids are often
  • that is obtained from or supplemented
  • the incidence of age-related conditions.
  • the elderly are more likely to contract
  • with age and producing fewer T cells
  • this increased risk correlates with a decrease
  • from the thymus atrophying
  • to fight off infection. Thymus function
  • whether the bone marrow becomes less efficient
  • Thymus function declines beginning at age 1. Whether
  • possibly from the thymus atrophying
  • may produce undesired side effects.

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, 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.
1. When the immune system is out of balance it can?
   A. Mistake ‘self’ cells for invading pathogens.
   B. Have no effect on the body.
   C. Mistake bone cells for invading pathogens.
   D. None of the above.

2. The immune system has two parts?
   A. Innate and adaptive.
   B. Innate and autoimmune.
   C. Autoimmune and adaptive.
   D. None of the above.

3. Which system initiates the immune response?
   A. Innate.
   B. Adaptive.
   C. None of the above.
   D. Both.

4. Which immune cells are integral part of the Innate immune system?
   A. Phagocytes which kill pathogens.
   B. Lysomes that destroy bacteria.
   C. Cytokine which cause inflammation.
   D. None of the above.

5. What do Natural Killer (NK cells) do?
   A. Target and kill viral- infected cells.
   B. Kill tumor cells.
   C. Kill bacteria cells.
   D. All of the above.

6. Does the adaptive immune system depend on the innate immune system?
   A. YES
   B. NO
   C. Only sometimes.

7. The main cells of the adaptive immune system are?
   A. T Lymphocytes.
   B. B Lymphocytes.
   C. Both T and L Lymphocytes.
   D. None of the above.

8. What response do TH1 cells give?
   A. They defend against bacteria and viruses.
   B. They defend against parasites and mucosal infections
   C. They produce antibodies.
   D. All of the above.

9. What can weaken the immune system?
   A. Everyday emotional and physical stress.
   B. Secondary bacterial infections from viral infections.
   C. Both of the above.
   D. None of the above.

10. Why is it important not to boost or suppress the immune system?
    A. Boosting may lead to an over active immune system causing autoimmune diseases, inflammation and allergies.
    B. Suppressing the immune system may reduce the body’s defense and repair function.
    C. Both of the above.
    D. None of the above.