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ABSTRACT

Our immune structure is vital for our survival, without it, our bodies would be open to outbreak from bacteria, viruses, parasites, and other foreign particles. So, it is only immune system that keeps us strong in this environment that is full of pathogens. The immune system is a complex web of cells and proteins that protects the body from any infection. This huge network of cells and tissues is continuously on the viewpoint for attackers i.e. all pathogens and foreign particle, and once an enemy is marked, a composite attack is mounted by the immune system. The immune system saves a record of each germ (microbe) it has ever overcome so it can recognize and destroy the microbe quickly if it enters the body again.

Keywords: Immunity, cells, infection, proteins, environment, tissues and huge network.

INTRODUCTION

The immune system is spread all over the body and includes many types of cells, organs, proteins, and tissues. Significantly, it can differentiate our tissue from foreign particles. Dead and damaged cells are also recognized and clean away by the immune system.

Numerous factors like sleep, diet, stress and hygiene can affect the immune system's performance, and any offsets in these behaviors can cause mess on immune function. Frequently, the impact of these factors go unnoticed, but if anyone is tending to get sick after a big project at work, it is likely because the immune system has suffered due to tension, lack of sleep, binge eating or unhygienic activities.

Inside factors of body that effects immune system

For several ages, the branch of biology that studies the immune system, focused on dissecting the molecular mechanisms which controls the physiological response to infections founded on the postulation that this response does not differ among individuals is termed as immunology [1]. The age, sex, infection history, and genetics may affect immune system and make us more disposed to to disease.

1. Melatonin is an influential natural hormone, which is well known for its relationship with circadian and seasonal rhythms, and its amalgamation is controlled by the environmental light/dark cycle. Melatonin take part in various functions of the body, among which its immunomodulatory role

has expected considerable significance in recent years. Melatonin has been reported as an effective in fighting numerous bacterial and viral infections. Melatonin has been exposed to be involved in the regulation of both cellular and humoral immunity [2].

2. The co-relation between vitamin D deficiency and vulnerability to infection has been suggested for long ago. Recently, epidemiologic researches have established strong relation between seasonal variations in vitamin D levels and the occurrence of several infectious diseases. Noteworthy, seasonal vitamin D level variations were observed in some communities, which expose a variation of values for 25-(OH) D, increased during summer and spring, while gradually decreasing in autumn and winter [3].
3. The skin and mucous membranes, that lines digestive system, nasal cavities, lungs and urogenital systems, create physical barriers and work in aggregation with the immune system to prevent us from infection.
4. Newborn's immune systems are undeveloped and for the first few months they are depending completely on mother's breast milk. As the newborn encounter bacteria and viruses, the immunity gradually develops and strengthens [4]. A complex variety of immune cells attack invading organisms at the same time as antibodies

quickly mount an immune response building up the immunity to protect us, should we encounter the same virus in the future.

5. The lymphatic system stocks this protective army i.e. cells of immune system. The Lymphatic System is consisting of the thymus, spleen, tonsils, lymph glands and lymph tissue in the gut and lymph vessels, it filters blood, finishes bacteria and trains up immune cells ready for release into the blood system. As well as dealing with probable and possible pathogens, our immune system is too answerable for sweeping up any damaged or infected cells which go wrong and have the potential to be cancerous [4].

Practices improving immune system

The immune system is designed to detect and destroy foreign invaders inside the body like bacteria and viruses. When working optimally, the immune system can prevent sickness when we're exposed to germs.

1. Frequent washing of hands

People generally tend to underestimate their hygiene through washing their hands. And even if they wash their hands, they may not be doing it correctly.

Washing hands with soap and water removes not only germs but also dust [5]. This can reduce the danger of infections by 50%. On the other hand, hand sanitizer can kill up to 99.9% of germs to keep bacteria at bay.

2. Sleep- Wake Cycles

The immune system is effected by the sleep-wake cycles of a day (24-hour) rhythms means a day sleep-wake cycle. Studies suggest that sleeping, decreases the levels of the stress hormone cortisol, which can subdue immune function, and increases the signals that triggers the immune system.

While sleeping, the immune system releases proteins known as cytokines, that promotes sleep. Certain cytokines are essential to increase when any infection or inflammation, is there in the body or even when any individual is under anxiety. Lack of sleep may reduce the release of these defensive cytokines. Researchers reports that sleep can help immune cells attach to targets and help to fight infection [6-7]. The study reveals how sleep supports the body in fighting infections, whereas conditions like chronic stress can

make the body more susceptible to illness.

3. Balanced Diet

Eating enough nutrients as part of a varied and balanced diet is required for the health and functioning of all cells, including immune cells. Certain type of diet pattern may better organize the body for microbial attacks and excess inflammation, but it is unlikely that distinct foods offer special protection. Each phase of the body's immune response relies on the presence of many micronutrients. Examples of nutrients that have been recognized as for the growth and functioning of immune cells comprise of vitamin C, vitamin D, zinc, selenium, iron, and protein (including the amino acid glutamine). These are found in a variability of plant and animal foods.

Diets that are deficient in variety and minor in nutrients, such as some are containing primarily of ultra processed food and deficient in slightly processed foods, can negatively affect a healthy immune system. It is also supposed that a diet high in refined sugar and red meat and low in fruits and vegetables can encourage the disorders in healthy intestinal microorganisms, subsequent in chronic inflammation of the gut, and related with suppressed immunity.

The micro biome is an internal colony of trillions of microorganisms or microbes that are living in body, mostly in the intestines to maintain the gut flora. The gut is a main site of immune activity and the synthesis of antimicrobial proteins. The diet plays very important role in defining the kinds of microbes living in intestines [8]. A high-fiber plant-rich diet with adequate amount of fruits, vegetables, whole grains, and legumes appear to support the growth and maintenance of useful microbes. Certain helpful microbes break down fibers into short chain fatty acids (SCFA), which initiates the immune cell activity. These fibers are sometimes called prebiotics as they nourish microbes. Consequently, a diet comprising of probiotic and prebiotic foods may be beneficial. Probiotic foods contain alive helpful bacteria, and prebiotic foods contain fiber and oligosaccharides that nourishes and maintain healthy colonies of these bacteria.

- Probiotic foods: Kefir, yogurt with live active cultures, fermented vegetables, sauerkraut, tempeh, kombucha tea, kimchi, and miso.

- Prebiotic foods: Garlic, onions, leeks, asparagus, Jerusalem artichokes, dandelion greens, bananas, and seaweed. However, a more general rule is to eat a variety of fruits, vegetables, beans, and whole grains for dietary prebiotics.

4. Levels of stress Hormone

Cortisol is normally an anti-inflammatory hormone that contains the immune response, but chronic elevations may resist the immune system to an accumulation of stress hormones, and increased production of inflammatory cytokines that further negotiate with the immune response

Overall, cortisol improves the immunity by restrictive inflammatory features.

High stress levels can also cause depression and anxiety, again leading to higher levels of inflammation. In the long-term, sustained, high levels of inflammation point to an overworked, over-tired immune system that cannot appropriately protect the body.

In addition, to the direct impression of stress on immune function, unmanaged stress can influence the sleep patterns, mood, dietary intake and physical activity levels [9-10]. All of these factors are associated with immune system function.

5. Supplement Intake maximizes immune supportive nutrients

To promote and support healthy behaviors, supplements and fortified foods have been widely used to support immune health.

1. Beta-glucan is an emerging ingredient in immune health supplements. Beta-glucan is a nature found glucose polymer or insoluble fiber found in cereal grains like oat and barley, certain types of mushrooms, yeast, seaweed, and algae. Although all types of beta-glucan have some health benefit, the beta-glucan found in yeast, mushrooms and algae can provide benefits that support immune health [11].
- Consumption of a good quality food, as represented by the Healthy Eating Plate, can prevent deficiencies in these nutrients. However, there are certain populations and conditions in which one cannot always eat nutritious foods. In such conditions a vitamin and mineral supplement may benefit to fill the nutritional gaps. Studies have shown that vitamin supplementation

can improve immune responses in these groups [12-13]. Low-income households, pregnant and lactating women, infants and toddlers, and the critically ill are examples of groups at risk.

- The elderly is predominantly a high-risk group. The immune response normally deteriorates with increase in age as the number and quality of immune cells decreases. So, a complex risk of poorer outcomes if the elderly develops chronic or acute diseases. Some causes include a poorer hunger due to chronic diseases, depression, or loneliness; multiple medications that can inhibit with nutrient absorption and appetite; malabsorption due to intestinal issues; and increased nutrient needs due to hyper metabolic states with acute or chronic situations. A general multivitamin/mineral supplement providing the recommended dietary allowances (RDA) may be used in these cases [14]. The vitamin supplements should not be considered a substitute for a good diet as no supplements contain all the benefits of healthful foods.
- Vitamin C improves WBC response, rises the interferon amount and improves the integrity of the mucous membranes.
- Vitamin A is playing a very important role in the health of the skin and mucosal walls as well as increasing the WBC function, antibody response and thymus function.
- Vitamin E is active component for both cell-mediated and antibody related immunity, and deficiency results in significant impairment of immune function.
- Deficiency in B6, B12 and folic acid impairs immune function and immune response.
- Zinc encourages the destruction of foreign particles, is required for proper functioning of WBC and activates immune enhancing thymus hormone.

Exercise/Physical Activity

Regular workout can boost immune system and help to fight off infections. Physical activity is vital for ensuring an effective lymphatic system as, unlike the circulatory system, it relies on muscle contraction to keep up the flow [15-16]. Exercise permits immune cells to perform efficiently as it

increases the blood flow and reduces stress, inflammation, and strengthen antibodies that helps to boost immune system.

Researchers presented that exercise progresses the immune and metabolic systems. Regular exercise increases body's production of antibodies and T-cells, causing them to circulate more fast and quickly [17-19].

Living a slight dirty

Our immune system develops properly when we are exposed to bugs, so let the children or grandchildren get dirty outdoor.

Go cautiously with sugar

Sugar significantly reduces the ability of white blood cells to destroy pathogens. Studies approves that increase in sugar intake suppresses the immune system. If foods and beverages are high in sugar or refined carbohydrates are consumed, that the human body processes as sugar, this may be reducing the body's capability to fight from foreign particles or pathogens

Encourage healthy gut flora

Around 70% of our immune system is situated in the intestinal gut. The bacteria in gut works integrally with the immune system to form oral tolerance. Gut bacteria also crowd out pathogenic bacteria, avoid them from following to the lining of gut and gaining entry, as well as manufacturing lactic acid that helps to stop harmful bacteria growing [20-22]. In order to encourage good bacteria, eat plenty of fibrous and pre-biotic foods such as bananas, chicory, Jerusalem artichokes and flax seeds are particularly good, and consider taking a live bacteria supplement. Bacillus coagulans is ideal as it is a hard spore form of bacteria that rapidly activated in the gut to produce lactic acid, which other, more resident bacteria strains

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such as Lactobacillus and Bifid bacteria need to survive.

Be mindful of alcohol intake

Excessive consumption of alcohol reduces the number and function of three important kinds of cells in your immune system—macrophages, T and C cells.

Macrophages are the first line of defense against disease. They eat anything which is not supposed to be there, including cancerous cells, and they are alarming if pathogens are present.

T cells are antibodies to specific pathogens. The T cells already know how to kill the specific kinds of viruses.

B cells are white blood cells that secrete cytokines that attack bacteria.

When B and T cells are suppressed, the immune system is less efficient at recognizing and destroying invading pathogens. Although regular heavy drinking of alcohol is clearly the most awful for the immune system, binge drinking can also damage the immune system temporarily. Alcohol is known to increase susceptibility to infection - lowering the rate at which white blood cells mobilizes to areas of infection [23-24].

And finally, laugh!

Laughter decreases the level of stress hormone like cortisol, epinephrine, adrenaline etc. in the body, and while stimulating happy hormones like endorphins. Studies have shown that even a "false" laughing can elevate the mood.

Research consistently shows laughing helps activate natural killer cells, SIgA levels and gamma interferons - all measures of immune function.

So, go ahead and have some fun in the full knowledge that you are giving your immune system a wonderful boost.

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