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Immune Boosting Drugs -A Myth or Reality - A Review

Allour Vaishnavi[1], Anitha Roy[2], A.K.Anjali[3]

[1]Research Associate, Dental Research Cell, [2]Associate Professor, Department of pharmacology,[3]Lecturer, Department of General Pathology, Saveetha Dental College and Hospitals, Saveetha Institute Of Medical And Technical Sciences, Saveetha University, Chennai, India

Abstract

The concept of boosting immunity was a popular one. Although the lay public is exposed to information on how to boost immunity and the only evidence-based approach to this is vaccination. The aim of this review was to analyze such immune boosters as a myth or reality and the information about immune-boosting drugs available on the Internet. Of the 30 approaches to boost immunity recorded, the top ones were diet (76%), fruit (70%), vitamins (65%), antioxidants (54%), probiotics (52%), minerals (49%), and vitamin C (56%). Interestingly, vaccines ranked 27th, with only 12% mentioning them. Commercial websites are an important component of the information available to the public on the topic and thus contribute to providing information that is biased. Vaccines have developed society by saving lives and dramatically reducing the burden of infectious disease. Most successful vaccines have been developed empirically, but recent advances in immunology are beginning to shed new light on the mechanisms of vaccine-mediated protection and the development of long-term immunity. The role of vaccination is to generate long term protection against diseases. Prime-boost vaccine strategies could improve cellular and also humoral immunity in several animal models, among various vaccine modalities. Although natural infection will often provide lifelong immunity, current vaccinations need a booster dose to achieve durable protective humoral immune responses, regardless of whether the vaccine is based on infection with replicating live-attenuated vaccine strains of the specific pathogen or whether they are derived from immunization with inactivated, non-replicating vaccines or subunit vaccines. This review discusses the recent advances in immunization and the immune boosters and decides whether these are a myth or reality.

Keywords *immune boosters; vaccine; health; immunological memory; protection.*

Introduction

Immunity is the major mechanism of the host to defend against the eradicating disease which is caused by infectious agents. Successful vaccinations could help in boosting immunity. Substances that help in the stimulation of the immune system by inducing activation or increasing activity of any of its components are known as immunostimulants or immunostimulators. They are available as drugs and nutrients.[1] Immune boosters include vitamins, minerals, antioxidants, probiotics, other supplements, and the dietary complementary and approach chiropractic or yoga and the vaccination.[2] A booster dose or booster vaccination is a re-exposure of immunizing antigen which is exposed after the initial immunization. [3] It is intended to increase the immunity back to protective levels against that antigen after memory has deteriorated overtime against that antigen. Arthus reaction, patients receive a booster dose but already have a high level of antibody in the body may develop, an inflammation that is caused by a localized form of Type III hypersensitivity induced by high levels of IgG antibodies.[4]

Corresponding author:
Anitha Roy
Associate Professor, Department of pharmacology,
Saveetha Dental College and Hospitals,
Saveetha Institute Of Medical And Technical Sciences,
Saveetha University,162,PH Road,Chennai 600077,
Tamilnadu,India. Contact number:9840787458
Email Id: anitharoy@saveetha.com.

Ginseng is a characteristic rejuvenator and furthermore it is a safe and non-harmful substance to the body and goes about as an immune booster, vitality, and health and helps the body to adapt to different forms of stress. Besides ginseng, regular uptake of vitamin-D also helps in preventing yourself from frequent diseases.[5] Immunity can be improved by dietary supplements and plant products. Plants products are extensively evaluated for their acting various use in different disease conditions like cancer, diabetes, hepatotoxicity. [6 7 8] Plants such as *Caralluma fimbriata,Azadirachta indica,Acacia catechu ,Syzygium cumini, Garcinia mangostana,Brassica oleracea* are evaluated for their various pharmacological activities.[9 10 11 12 13 14 15 16]Amla fruits and aloe vera have been gaining wide popularity in recent years in India as well as in other parts of the world, but the mechanism of action of most of these fruits and plants has not been subjected to thorough scientific investigations. Hence much research is carried out in this field. Plant based nanoparticles are extensively used for the preparation of various formulations and treatment of many diseases. [17 18 19 20 21 22 23 24]Indeed, findings suggested that these plants and their bioactive metabolites are effective in balancing and proper functionality of the immune system through various modules of immune modification like stimulation and suppression.

IMMUNE BOOSTING DRUGS

One of the most common misconceptions in vaccinology is that inactivated vaccines and subunit vaccines are weaker immunogens and will require booster vaccination whereas live, attenuated vaccines are expected to elicit the same degree of durable protection as that achieved by natural infection.[25] This does not appear to be the case since, with the possible exception of rubella, essentially all common childhood vaccines require booster vaccination regardless of whether they are non-replicating vaccines or live, attenuated vaccines. Measles and mumps, for example, are often described as "childhood infections" because a person is typically infected once and then maintains lifelong immunity thereafter.[26] However, unlike wild-type strains of measles and mumps, infection with the attenuated vaccine strains of these viruses is insufficient to provide long-term protective immunity after a single dose and a 2-dose regimen is required in order to achieve sustained protection and broad herd immunity.

Supplement through Diet

Low fat and plant related help in boosting the immune system. The immune system relies on white blood cells that produce antibodies to combat bacteria, viruses, and other invaders. Vegetarians have been shown to have more effective white blood cells when compared to nonvegetarians, due to a high intake of vitamins and low intake of fat.[27] Eating a low-fat diet may also be protective. Studies have shown that limiting dietary fat helps strengthen immune defenses. Research also shows that oil may impair white blood cell function and that high-fat diets may alter the gut microbiota that aid in immunity.[28]

Maintaining a healthy weight can also benefit the immune system. Obesity has been linked to increased risk for influenza and other infections such as pneumonia. Plant-based diets are effective for weight because they are rich in fiber, which helps fill you up, without adding extra calories. Fiber can also lower BMI, which is linked to improved immunity. A plant-based diet has also been shown to reduce inflammatory biomarkers.[29].

Vitamins

Vitamins are the vital substances that our body needs daily to grow. Vitamins play an important role in various immunity processes which include lymphocyte activation and proliferation, T-helper-cell differentiation, the production of specific antibody isotypes and regulation of the immune response, etc. Vitamin C is the biggest immune system boosters that is required daily because the body doesn't produce or store it. Vitamin E is a powerful antioxidant that is present in nuts, spinach, etc. Vitamin A helps to strengthen the immune system against infections. It also acts as a regulator in tissue and cell growth. Many products claim to support or.boost immunity. The capability of the immune system reduces as the age increases and the body becomes prone to more infectious diseases.

The immune system is a network of specialized organs, tissues, cells, proteins, and chemicals, which has evolved in order to protect the host from a range of pathogens, such as bacteria, viruses, fungi, and parasites, as well as cancer cells. Early on, it was noted that scurvy often Nutrients 2 of 25 followed infectious epidemics in populations, and cases of scurvy have

been reported following a respiratory infection. This is particularly apparent for individuals who are already malnourished.[30]. To prevent Hypervitaminosis C, a regular and adequate intake of vitamins was required to the body because the body storage capacity for water soluble vitamins was very low. Epidemiological studies have shown that hypovitaminosis C which is plasma vitamin C < 23 μmol/L was relatively common in Western countries whereas vitamin C deficiency that is <11 μmol/L was the fourth leading nutrient deficiency in the United States. [31]There are several reasons why vitamin C dietary recommendations are not met, even in countries where food availability and supply would be expected to be sufficient. These include poor dietary habits, lifestyles either limiting intakes or increasing micronutrient requirements such as smoking and alcohol or drug abuse, various diseases, exposure to pollutants and active and passive smoking and poor socioeconomic status and limited access to nutritious food. Even in industrialized countries can be at risk due to lifestyle-related factors, such as those on a diet or eating an unbalanced diet, and people facing periods of excessive physical or psychological stress.

VACCINATION

A vaccine is a biological preparation that provides a specific infectious disease with successfully acquired immunity. A vaccine usually contains an agent that resembles a microorganism that causes disease and is mostly produced from weakened or killed types of the microbe, its toxins or one of its surface proteins. The agent activates and kills the body's immune system to identify the agent as a threat and to further identify and kill all of the microorganisms that could be associated with that agent in the future. Vaccines can be prophylactic (to prevent or mitigate the effects of a future infection being investigated by a natural or "wild" pathogen), or therapeutic, such as cancer vaccines.[32,33]

Some vaccine safety issues relate to how vaccines interact with the immune system (for example, too many vaccines) or just how the immune system operates in various circumstances (for example, natural infection versus immunization). Although these issues should be treated equally, it is important to understand them in the sense of how the immune system functions. Vaccine immunization, like normal infections, causes long-lasting immunity[34] Yet unlike normal infection, immunization does not gain such high immunity rates.[35]

ROLE OF IMMUNE BOOSTERS IN HEALTH

Vaccines have given numerous examples of overcoming adversity and even a prerequisite for a solitary sponsor inoculation is a little cost to pay for solid invulnerability without requiring serious or possibly hazardous infectious conditions rather than the confirmed ones. In any case, a few immunizations are just somewhat viable much after different vaccinations(e.g., acellular pertussis) and the advancement of better immunization methodologies that require fewer promoters is a significant objective, particularly in creating nations in which routine inoculation can be entangled by calculated difficulties for finishing essential inoculation regimens. One approach to improve immunizations is to analyze effective antibodies and recognize potential factors that might be engaged with deciding long term immunization adequacy. In expansive terms, antibodies or vaccines can be sorted into three general classes: multivalent non-protein antigen, monovalent protein antigen, and multivalent protein antigen. As indicated by the engraved life expectancy model for acceptance of enduring plasma cells incitement of T cell-free counteracting agent reactions will be generally momentary without T cell help. Albeit monovalent protein antigens will obtain better, increasingly tough immune response reactions (because of obtaining of T cell help), the most enduring counteracting agent reactions are anticipated to happen when a multivalent antigen triggers solid B cell initiation just as viable T cell help.[36]

Polysaccharide antibodies, for example, Pneumovax-23 can evoke B cell initiation through the grouping of the B cell receptor (BCR) yet without a related protein in the immunization, this happens without related T cell help by CD4+ T follicular partner cells (TFH).[37] This T-independent immune response reaction gives just a restricted term of assurance in senile subjects and antibody reactions decrease to gauge levels inside 3–5 years after inoculation. Additionally, T-free counteracting agent reactions neglect to build up memory, and re-immunization with refined polysaccharides have been found to bring down serum neutralizer reactions, and reduction in the recurrence of antigen-specific memory B cells. To conquer these confinements, more

current polysaccharide immunizations, for example, Prevnar-13 are conjugated to a carrier protein (e.g., CRM197, a detoxified freak of diphtheria poison) and this, not just outcomes in counter acting agent reaction of higher ardentness, yet immunological memory is all the more seemingly perpetual.[38]

IMMUNE DISORDERS

The immune system begins to develop in the embryo and is localized. In several parts of the body. Immune cells develop in the primary organs like bone marrow and thymus. Immune responses occur in secondary organs like spleen etc. Immune disorders have been known to occur where the body produces antibodies that attack its own tissues, leading to deterioration and, in some cases, tissue destruction. [39]

Immune disorders are Respiratory, Inflammatory, Cancer, AIDS. The dysfunction of the immune system is an immune disorder. According to the International Union of Immunological Societies, more than 150 primary immunodeficiency diseases (PIDs) have been characterized.[40]However, the number of acquired immunodeficiencies exceeds the number of PIDs. Those caused by inherited genetic mutations are the primary immune deficiency diseases. Secondary or acquired immune defects, such as a virus or immune suppressing medications, are caused by something outside the body.[41]

RESPIRATORY DISORDERS

Viral rhinorrhea

Viral rhinorrhea is an acute, inflammatory state of infectious origin in the upper airways. Side effects of nasal congestion, discharge, and sneezing plus impaired alertness and fever atypically high sublingual temperature relative to clock-hour normative level intensify at night and are typically rated worse at morning awakening, but at the highest midday cough frequency.

Allergic rhinorrhea

Allergic rhinorrhea- immune system-mediated upper airways hypersensitivity to the environment and other antigens is expressed as inflammation of the tissue of the respiratory tract, activation of the mucus gland, and dilation of the blood vessels. The main signs of nasal congestion, discharge, and sneezing; swollen, itchy, watery eyes; and itchy mouth, nose, and throat slowly worsen late at night and overnight; Sleep and overall quality of life was commonly compromised. However, recalling and prospective daytime self-assessment studies typically rate symptoms worse when morning sleep awakens.[42]

Inflammation and cancer

Inflammation is often linked to cancer development and progression. Genetically stable are the cells responsible for cancer-associated inflammation and thus do not experience the rapid development of drug resistance; thus inflammation targeting provides an effective strategy for both cancer prevention and cancer therapy. Several factors induce tumor-extrinsic inflammation, including infections with bacteria and viruses, autoimmune disorders, obesity, cigarette smoking, exposure to asbestos, and excessive alcohol intake, both of which raise cancer risk and promote malignant progression. In comparison, cancer-intrinsic or cancer-induced inflammation can be caused by mutations that cause cancer and can lead to malignant development by recruiting and stimulating inflammatory cells. Both extrinsic and intrinsic inflammations can contribute to immunosuppression, providing a favored backdrop for the development of tumors.[43]

Symptomatic treatment

Although the principle of treatment of autoimmune movement disorders should focus on treating the underlying neuroinflammatory process it is often necessary to treat symptoms. A pragmatic summary of some commonly used symptomatic medications used in these disorders. It should be noted that these disorders can be dynamic and changing, and drug withdrawal or escalation may be required depending on disease evolution. It is also commonly observed that there is a higher risk of side effects with some of these agents, such as dystonia or neuroleptic malignant syndrome in anti-NMDAR encephalitis patients given neuroleptics. Optimizing the sleep wake cycle is often a priority to allow the child and family to rest. Important underlying principles with symptomatic management were to try and use medications that may improve multiple symptoms and to reduce the severity to enable comfort with unnecessarily using high doses that may lead to higher risk in dose related adverse effects.[44,45]

Conclusion

Immune boosting drugs were the most essential therapy. Immunotherapy was only a single therapy that is not very effective. combination of the conventional method was most appropriate. Eating more fruits and vegetables can keep the immune system strong. Vitamins and supplements can help ward off disease and make people feel better faster. A positive mindset can boost the immune system.

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