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IMMUNITY IN AYURVEDA [INDIA] AND NATURAL IMMUNITY BOOSTERS AT A GLANCE

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ABSTRACT

The most complicated and advanced system on Earth is the human body. Although the body is capable of handling many issues on its own, some diseases and infections are so severe that they must either be quickly fought or avoided by regularly bolstering the body's defences. The body's immune system's main job is to boost the immune system's ability to defend itself. One of the biological systems in the body with the most complexity is the immune system.

Our bodies are shielded from the majority of infections by a robust immune system. In spite of this, certain diseases are caused by the body's organs or physiological fluids failing, while others are caused by the invasion of foreign germs including bacteria, viruses, and parasites. By employing immune cells, primarily lymphocytes (B-cells and T-cells), macrophages, and monocytes, the immune system helps to eliminate microbes from the body.

Here, we're talking about immunity from an Ayurvedic standpoint. Many Ayurveda treatments are addressed for ailments affecting different body systems, and the bulk of Ayurvedic medications are created from naturalingredients.

The classifications of the immune system used in Ayurveda are very similar to those used in modern medicine [1].

1 Sahaja (Innate)
2 Kalaja (Chrono-biological)
3 Yuktikrut (Acquired)

Immunity (Bala) in ayurveda is defined as the body's ability "to avert andprevent the progression of disease for preserving homeostasis"[1].

The body's immune system uses distinct receptors to recognise pathogens and immediately react by activating immune cells, cytokines, and chemokines, as well as releasing inflammatory mediators.

The existing classical Ayurvedic writings address the treatment of a variety of diseases [2][3]. Many Ayurveda treatments are available for ailments affecting different body systems, and the bulk of Ayurvedic medications are created fromnatural ingredients.

During an infection, the immune system is under attack by a huge variety of viruses, bacteria, and fungi. Medical plants have a significant role in protectingpeople from a variety of harmful pathogens and diseases. Natural immune modulators are present in several therapeutic plants. It is believed that a number of medicinal plants can restore the body's natural resistance to infection and foster good health. These factors control and enhance the immune system. Immunity can be enhanced by using immunity supplements and living a healthy lifestyle.

IMMUNITY IN AYURVEDA

According to Ayurveda, immunity is related to Vyadhi-kshamatva, or the body's capacity to halt the development and spread of illnesses [4]. Bala (strength) and Ojas (the essence of the seven Dhatu) can also be used to describe immunity. Bala is a symbol for physical strength, and Prakruta Kapha gives the body its physical strength. Charaka regards Bala as an ojas [5][6].

Any deviation from the regular operation of the Bala, Kapha, and Ojas leads to immune system disturbance, which may cause various disorders.Early Ayurvedic scriptures describe this concept in a way that is analogous to what is currently is understood about immunology. The notion of Vyadhi-kashmatva, which denotes a person's immune condition, health, and strategies for disease prevention, is covered in great detail in Ayurveda.

The advances in modern science's knowledge of the neuroendocrine-immune system and the function of circadian clock helps demonstrate the similarity between Ayurvedic concepts like Vyadhi-kshamatva, Oja, and Bala and immunology [7].

Recent studies have shown that using the Ayurvedic notion of immunity, diseases and conditions with altered immune responses can be prevented.Hence, the elements impacting immunity as indicated in the traditional Ayurvedic writings were gathered and thoroughly examined in the current article.

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FACTORS AFFECTING IMMUNITY IN AYURVEDA

1] AGNI (Digestion and metabolism) :-

Agni, the energy responsible for digestion, metabolism, and nutrient absorption, governs the body[8]. According to the ancient Ayurveda text authored by Acharya Charaka, Agni is the root cause of life, wellness, greatstamina, normal Ojas, resistance to disease, drive, and body lustre [9].

All ailments are caused by Mandagni (hypo-metabolism), and the Ayurvedic approach to treating them all begins with bringing the Agni back to normal [8].Even the very fact that a person exists is credited to Agni [9].

Our immune system and general health are strongly correlated with our digestive system. The immune system in the gut is constantly observing the various viruses, bacteria, and germs that are contained in food and enter the human gut on a daily basis [10]. To maintain gut microflora, the immune system's pro-inflammatory signals and repair signals must exist in balance. Our immune system is shaped by our gut microbiota.

The major host response to invading microbes is maintained by innate immunity, which causes an inflammatory reaction to localise the infection and stop pathogens from spreading throughout the body. When TLR (Toll-like receptors) and bacteria interact, they serve as a defence against external attack by the immune system [11]. The TLR signalling is aware of any issue in the colon, which may be inflammation or even cancer [12]. This illustrates how the immune system and digestive system interact and how weakening of one can lead to weakening of other.

2] FOOD AND DIET :-

One of the key indicators of health, longevity, and happiness is a balanced diet [13]. Pustivardhak (nourishing), Medhya (improving intelligence), and Balya are the recommended foods (increasing strength and immunity). A nourishing diet helps the body grow and develop in a healthy way throughout life.

Nutritional factors affect the immune system, altering how immune cells and the gut microbiome operate [14]. The immune system's cells and antibodies arecompromised by improper diet and food deficiency. It is impossible to overlook the connection between diet, the gut flora, and autoimmune illness. Food ingredients having sequence

homologies to human tissue can cause autoimmune disorders due to molecular mimicry [15]. Older persons have been found to be more susceptible to infections because of inadequate nutrient absorption and inappropriate dietary consumption, which ultimately lowers the immune system.

3] SLEEP :-

For a person to live longer, they must get enough sleep [16]. Sleep also helps to maintain the body's health and immune system, serving as the major mediator between these factors. Sleep, immunity and dosha are all interrelated in ayurveda. The distinctive feature is that a person's predominant Dosha in their

Prakruti impacts how well they sleep and hence how well their immune system functions [17].

There aren't many studies demonstrating how immunity, sleeping and circadian cycle are related to each other.The levels of prolactin and growth hormone show a diurnal peak during the night and their levels are further increased by sleeping and on other hand, cortisol levels and sympathetic tone show a fall during the night time which is further decreases during sleep. This is the endocrine fluctuation in the body between day and night and its increased effect while sleeping.

Similarly, it is well researched that cytotoxic effector leukocytes and anti-inflammatory cytokine like IL-10 are at their peak at day time and pro-inflammatory cytokines like IL-2 and naive T-cell production are at their peaks at night time.

To correlate the above two mechanisms, it shows during the night and especially while sleeping, the circadian clock and the sleep trigger the endocrine and immunity cycles in a way that are helpful in inducing changes in leucocytes and pro-inflammatory cytokines shift [18].

4] PSYCHOLOGICAL STATUS :-

Mental fortitude and psychological health improve illness resistance and the immunological response. Factors such as stress, depression, lack of social support, can influence both cellular as well s humoral response factors of immune system and its functions. The immunological response is also influenced by a person's psychological state [19]. The idea that people with emotional affective styles are more likely to get sick is supported by some evidence [20].

According to a study [21], spiritual healing and social support were found to increase HIV patients' immune responses in an effort to preserve sanity and emotional well-being.

CERTAIN PLANTS WITH IMMUNOMODULATORY PROPERTIES :-A SHORTLIST

Ginseng [22] [23] [24] :-

Biological source : It is derived after drying the roots of following varieties of Panax plant Panax ginseng found in Korea. anax japonica found inJapan. Panax notoginseng found in China. Panax quinquefolium found in America.

Triterpene glycosides, also called as ginsenosides, are present in ginseng. Many active ingredients such as different amino acids, polypeptides and proteins , different alkaloids, phenols, B1 and B2 vitamins are present in mostlyall parts of the plant.

Ginseng is referred to as a "adaptogen," which implies that it has a number of physiological impacts on the body, such as improving the general resilience of the body to physical as well as biochemical stress and hence extending life span and enhancing cognitive function. Various reviews suggest the immune system which is under the control of hypothalamic pituitary adrenal axis, is alsoaffected in a positive way by consumption of ginseng.

In vitro studies show elevated levels of natural killer cell production along with immune cell clearance following ginsenoside administration. According to a study by WHO INN 1999, ginseng saponins lower the levels of prolactin in serum, hence improving libido" in cases of male infertility.

Liquorice [25] [26] [27] [28] :-

Biological source : It is made up of dried root and stolon of the plant Glycyrrhiza glabra.

Triterpene saponins, amino acids, flavonoids, polysaccharides, pectins, simplesugars, mineral salts, and several other compounds make up the complex present in liquorice. Glycyrrhizin is responsible for the licorice root's sweet flavour.

There are numerous factors that contribute to licorice's health advantages. Glycyrrhizin and glycyrrhizic acid present in licorice have shown to prevent the reproduction of various viruses like hepatitis A9, hepatitis C, herpes simplex, herpes zoster, HIV and various DNA, RNA viruses.

Glycyrrhetic acid structure has similarity to the hormones secreted by the adrenal cortex and so liquorice shows similar activities like the mineralocorticoids and glucocorticoids. It also has a comparable effect to hydrocortisone since some of its constituents have steroid like anti- inflammatory properties.

Ashwagandha [29] [30] [31] [32] :-

Biological source : Withania somnifera's dried roots and stem make up the ashwagandha.

Alkaloids and steroidal lactones are ashwagandha's major chemical components. Withanine is the main component present in alkaloids. Anferine, anhydrine, Cuscohygrine, pseudo-withanine, , somnine, somniferine, somniferinine, tropine, and pseudotropine are the other components present in alkaloids. Two acyl steryl glucosides known as sitoindoside VII and VIII have also been isolated from the roots. The leaves contain withanolides, also called steroidal lactones. Ashwagandha lowers the expression of nuclear factor-kappa B, blocks intercellular tumour necrosis factor, and boosts apoptotic signalling in cancer cell lines and thus shows anti-carcinogenic activities.

Astragalus [33] [34] [35] :-

Biological source : It is made from the roots of Astragalus plants that are 4–7years old.

Mostly polysaccharides, amino acids, saponins, flavonoids, and trace elements make up astragalus complex.

According to research, astragalus root stimulates the immunity in different ways. The compounds it contains have been identified as glucans along with polysaccharide D. Their purpose is to boost the quantity and quality ofstem cells in bone marrow and lymphatic tissue while promoting their differentiation into functional immune cells.It seems to facilitate the changefrom a resting to an active state of immune cells. One study found that astragalus root also supports and maintains pulmonary function, stimulatesmacrophages and also helps to increase the body's production of immunoglobulin, T-cells and natural killer (NK) cells.

Moreover, astragalus provides cardiac protection, including defence againstoxidative damage, according to numerous studies.

CONCLUSION.

Ayurveda is a multifaceted, comprehensive science that offers unique strategies for building a strong immune system. The classical writings of Ayurveda state that there are a number of factors that affect a person's immunity. Identification and management of diseases begin with the quantification of these factors.

There are allopathic medications available to reduce oxidative stress and boost immunity, but their adverse effects and exorbitant costs necessitate the search for alternatives. The Ayurvedic medical system not only offers that substitute,

but also outperforms allopathic medication in terms of costs and side effects. The use of immunomodulators is growing rapidly. It is clear from the research provided in the article that herbals and botanicals are effective in treating diseases like immunomodulators and those that can lead to other immune disorders. Regarding drug development from natural sources, ayurvedic medicines have a promising character. One can anticipate that herbal substances will serve as the foundation for the creation of affordable, efficient,and nontoxic immunomodulatory agents.

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