



REVIEW ARTICLE

Understanding *Bala*: A Critical Perspective Through Classical and Modern Lenses with Reference to CD4 Percentage

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Abstract

Ayurveda promotes overall well-being by addressing the interconnected dimensions of physical, mental and social health. Within this framework, *Bala* is conceptualized as the body's innate strength and capacity to resist disease—encompassing not only physical endurance, but also immune competence, metabolic *Balance*, and psychological resilience. The development and maintenance of *Bala* are closely linked to the harmonious state of the Doshas, the nourishment of the Dhatus, and the optimal function of Agni. This article offers a critical exploration of *Bala* through the classical Ayurvedic lens, outlining its classifications, physiological determinants, and broader implications for health. In addition, it investigates the convergence of Ayurvedic principles with contemporary immunology, with a particular focus on CD4+ T lymphocytes, which are essential regulators of immune responses. The functional activity and percentage of CD4+ cells serve as a modern biomedical indicator of immune strength, reflecting the concept of Jeevasonita-rupi *Ojas* in Ayurveda. By bridging traditional wisdom and modern science, this article aims to deepen the understanding of *Bala* as a vital marker of health and immunity.

Introduction

Ayurveda, the science of life, offers guidance on practices that are beneficial for both present and future well-being. Ayurveda aims to promote overall wellness, prevent illness, and provide holistic cures for diseases. Its preventive strategies emphasize the empowerment of individuals to strengthen their immune systems. Promotion of positive health is essentially linked with functional integrity of body's internal environment, its control systems as well as natural defense¹. In Ayurvedic parlance the term *Bala* covers all these factors in a wide canvas. Health and longevity depend on *Bala*².

Bala is related to humoral, enzymatic, genetic, metabolic, psychic and nutritive considerations. *Bala* can be defined as "the efficiency in body functions which results from the endowment of dhatus highest discriminatory power³." *Bala* is explained as the efficiency in body activities attributed by the proper transformation of dosha dhatu and mala. This definition refutes all the interpretation that defines *Bala* as mere muscular physical activity⁴. A strong and

well-functioning defense mechanism is the cornerstone of good health. This immune system acts like an internal radar, constantly scanning for foreign elements and neutralizing potential threats⁵. In Ayurvedic terms, this protective strength is referred to as *Bala* or vyadhikshamatwa-the body's innate resistance to disease⁶.

In Ayurvedic literature, *Bala* is closely associated with the body's ability to resist and recover from diseases, a quality that parallels the role of CD4+ T lymphocytes in coordinating and sustaining immune responses. Cellular immunity, a core component of this defense, plays a crucial role in protecting the body against infections. It is primarily mediated by T-lymphocytes, especially CD4+ T cells (helper T cells), and macrophages. Unlike B cells, which secrete antibodies, T cells identify and eliminate intracellular pathogens. CD4+ T lymphocytes are central to this process, as they orchestrate immune responses by producing cytokines-chemical messengers that regulate immune cell activity, inflammation, and tissue repair⁷.

Thus, the strength of *Bala* in Ayurveda closely parallels the functional status of cell-mediated immunity in modern science, particularly the activity and count of CD4+ T cells, which serve as a measurable marker of immune competence and vitality⁸. This article aims to critically explore the concept of *Bala* as described in classical Ayurvedic texts, delving into its various classifications and the integral role played by *Thridosha*, Dhatus, and Agni in its manifestation and maintenance. Further, it attempts to correlate these foundational elements with modern physiological and immunological perspectives like CD 4, offering a holistic understanding of *Bala* in both traditional and contemporary healthcare contexts. Understanding CD4 percentage in relation to *Bala* can help physicians prescribe *Balavardhaka* medicines. It also aids students in grasping the concept of *Bala* more effectively.

Objectives

To understand the concept of *Bala* in Ayurveda

To gain a contemporary perspective by correlating it with the body's defense mechanisms, with special emphasis on CD 4 percentage.

Materials and methods

Data were collected from ayurvedic texts including bruhathrayee and laguthrayee. Articles available in search engines were also collected. A total of 12 articles were collected and reviewed. Data were also collected from modern and ayurvedic textbooks.

CONCEPT OF BALA IN AYURVEDA

The term *Bala* is derived from ' *Bala* pranane' which means to vitalize. Monier Williams describes its general meanings as power, strength, vigour. *Bala* refers to the body's strength or capacity to resist and overcome diseases. It is emphasized that it is this internal strength-*Bala*-that combats illness. In therapeutic contexts where langhana is prescribed, careful assessment of the patient's *Bala* is essential, as health fundamentally depends on it⁹. In such instances *Bala* indicates *vyadhi-kshamatwa* or immunity.

Classification of *Bala* (Strength/Immunity)

Bala is classified based on the mode of acquisition and the status or comparative level of *Bala* within the individual. Based on the mode of acquisition it can be classified in to *Sahaja*, *Kalaja* and *yuktikrita*¹⁰

1. *Sahaja Bala* (Innate Strength): *Sahaja Bala* is the natural, inborn strength present from birth and remains relatively stable throughout life. According to Gangadhar Rai, the commentator on the Charaka Samhita, *Sahaja Bala* is derived from foetal nourishment. It is believed that the foetus gains *Bala*, along with varna (complexion) and upachaya (growth), by the sixth month of intrauterine life¹⁰
2. *Kalaja Bala* (Time-Dependent Strength): Strength influenced by kala (time) can be categorized further into:
 - Seasonal variation: *Bala* is generally at its peak during Hemanta (early winter) and Shishira (late winter), and at its lowest during Grishma (summer) and Varsha (monsoon).
 - Age-related variation: Strength is comparatively lower in childhood and old age, and highest in young adulthood. Gangadhar Rai considers *Kalaja Bala* to be a relative state of *Sahaja Bala*, reflecting how strength changes with time. The classics advise following ritu charya (seasonal regimen) to maintain health and *Balance*.
3. *Yuktikruta Bala* (Acquired/Artificial Strength): *Yuktikruta Bala* is the strength developed intentionally through a proper combination of diet, lifestyle, and therapeutic interventions. It is cultivated through consumption of nourishing foods such as ghee and meat soup, proper physical activity, rest, and sleep, use of *rasayana* (rejuvenative therapies). One of the main objectives of rasayana therapy is to enhance *Bala*. Promotive and curative treatments aim to restore the balance of dhatus (body tissues), pacify disorders, and improve *Bala* and *Varna*¹⁰.

II. Classification Based on the Comparative Status of *Bala*

This classification assesses *Bala* in terms of its strength in the individual and includes: *uttama* (pravara) - superior or maximum strength, *madhyama* - moderate strength, *alpa*

(avara) - inferior or minimal strength. this categorization is particularly significant in clinical practice. charaka emphasizes its importance in deciding treatment strategies and predicting disease outcomes¹¹. Individuals with *Alpa Bala* cannot tolerate highly potent medications. Mild treatments may be ineffective for those with *Uttama Bala*¹². A patient with *Pravara Bala* generally have a favorable prognosis. A patient with *Alpa Bala* is more prone to disease and usually has a poorer prognosis.

Factors that enhance *Bala* (*Bala Vriddhikara Bhavas*): According to Ayurveda, the factors contribute to the enhancement of *Bala* (strength/immunity) are birth in regions and times associated with strong individuals, favorable climatic and seasonal conditions. healthy *beeja* (genetics) and *kshetra* (maternal environment), good nutrition and physical health, proper habits and lifestyle, mental calmness and emotional stability, positive behavior and cheerfulness, youthful age, regular and appropriate physical activity¹³.

Factors That Diminish *Bala* (*Balakshayakara Bhavas*): Conditions that are thought to impair *Bala* include severe infections (bhutopaghata), wasting conditions (kshaya, overexertion (shrama), poor nutrition or irregular eating habits, physical trauma or surgeries (abhighata), adverse seasonal, environmental, or age-related factors, mental stress-grief, anxiety, fear, and anger. Charaka Samhita also notes that the depletion of *varna*, *Bala*, *sneha*, and *Ojas* occurs due to disturbance in dosha and dhatu interactions [dosha dooshya pradooshana]¹⁴.

Physical Manifestation of *Bala*: *Bala*, or strength, is considered a function (karya) of *Ojas* and serves as an indicator of its level in the body. According to acharya sushruta, *Bala* manifests through sthiropachita mamsata (well developed and nourished muscle tissue), sarva cheshta-swapratighata (unobstructed physical, mental, and intellectual activities), swara and *varna prasada* (clarity of voice and complexion reflecting the state of prana and vitality), proper functioning of external and internal organs¹⁵. Structurally, *Bala* is evident through a healthy complexion and firm musculature. Functionally, it reflects in sharp cognition, seamless motor and sensory activities, and mental clarity. Overall, *Bala* signifies the integrated strength of body and mind, dependent on the *Balanced* state of doshas, dhatus, and malas.

Role of *Thridosha* in the maintenance of *Bala*

Bala, *varna*, *arogya*, and *upachaya* are expressed and maintained through the *Balanced* state of the *Thridoshas*. Many normal functions of the doshas directly contribute to physical strength. Their roles in regulating, transforming, and sustaining biological processes serve as indicators of *Bala*.

Role of *vatha dosha*

Among the five divisions of Vayu, imparting *Bala* is indicated as a specific function of Udana; it releases energy and facilitates speech, action, volition and effort, *Bala*, *Varna* and *Smrithi*¹⁶.

Table No. 1 important fuctions of *Vata* and the system involved¹⁷

Functions	Activities	System involved
Utsaha	Elation, Enthusiasm	Mental faculty, sexual activity, general features
Uchwasa and Niswasa	Respiration	Breathing
Chesta	Movements	Muscles, bones, joints, voice, hearing
Vegas	Natural urges	Urine, faeces, sweat, sleep, sexual life, menstruation
Samyagati of dhatus	Nutrition	Skin, hair, food, general features
Akshanam patavam	Sensoryorgan's intactness	Eyes, mouth, hearing, skin, voice

Role of *pitha dosha*

Grahani, identified as the pittadhara kala, abode of agni (digestive fire) and pitha. Since ayu (life span), *arogya* (health), *veerya* (vitality), *Ojas*, *bhutagni*, and *dhatvagni* all depend on agni, pitta is directly linked to *Bala* through its connection with agni¹⁸. According to Sushruta, the normal functions of pitta include *Ojokrit* (Supports the formation of *Ojas*)¹⁹. Thus, pitta contributes to both physical and psychological well-being.

Role of *Kapha dosha*

Kapha reflects the nutritional status of the body. As stated in the Charaka Samhita, *prakrita sleshma* (the normal, unvitiated form of *Kapha*) itself is considered *Bala*²⁰. Furthermore, *Ojas* and *Bala* are often used interchangeably with *Kapha*, as all three are nourishment-dependent. According to Vagbhata, *Kapha* contributes to stability, lubrication, endurance, virility, patience, intelligence, memory, and physical strength, owing to its inherent qualities such as *snigdha* (unctuous), *sheeta* (cool), *guru* (heavy), *manda* (slow), and *sthira* (stable)²¹. The five divisions of *Kapha* facilitate proper binding of joints, anointing, healing and impart compactness, strength and durability. *Kapha* is described as *Balakrit*, being responsible for both physical strength and *vyadhikshamatwa* (disease resistance), primarily through *slaishmika Ojas*. The function of *sthairya* (firmness), attributed to *Kapha*, reflects the body's integrity and sturdiness, especially at joints and structural sites²¹. The physical properties and functions of *Kapha* can be included under the activities of the skeletal, anabolic, immunological, and reproductive systems.

Role of Rasa dhatu: As the first dhatu, rasa plays a vital role in nourishment, serving as the body's primary nutrient pool. The sustenance of life relies on the continuous supply of poshya rasa dhatu. According to Acharya Sushruta, purusha (human body) originates from rasa²². It is closely associated with *Kapha* and *Ojas*. Rasa travels to the hridaya (heart) and from there, is continuously distributed throughout the body by vyana vayu, ensuring systemic nourishment, growth, and maintenance²³. It also represents the fluid component of the body. The quality and function of rasa directly reflect the individual's *Bala* (strength).

Role of Rakta dhatu: Rasa on reaching yakrit and pliha attain the characters of *Rakta* which performs the function of Jeevana. Varna prasada and mamsa poshana are other functions of *Rakta*²⁴. Stropachita mamsata and varna prasada are signs of *Bala*, hence *Bala* depends on sudha *Raktata*. *Rakta* is always interpreted as rasa *Rakta*. Some scholars are of the opinion that *Rakta* itself is *Ojas*²⁵. *Rakta* bestows *Bala*, varna and longevity²⁶. Acharya Susruta explains the *visudha Rakta* lakshana which indicates the primary health index. *Rakta* is the root of life. The qualities of *Raktasara* purusha mentioned by Charaka points to signs of *Bala*, *Rakta sarapurusha* possesses *anathiBala*.

Role of Mamsa dhatu: In the context of *Bala*, mamsa occupies a significant position. The dhatu responsible for kriya (activity) is mamsa. It is said that complete skeletal system attains strength due to mamsa only and in classics mamsa dhatu represents the growth of the body. Lepana and nourishment of medodhatu are the most important functions of mamsa dhatu. Mamsa sara individuals are bestowed with good *Bala* and arogya. Therefore *Bala* should be assessed from activities related to mamsadhatu.

Role of Medas dhatu: It imparts strength, durability and compactness to the bone. It is the form in which energy is stored. The qualities of medas are similar to those of *Kapha*. Moreover in diseases where there is medodhatu vitiation, there is depletion of *Bala* and *Ojas*.

Role of Asthi dhatu: Samhanana is related with asthi dhatu. The sakti and upachaya form of *Bala* is effected by excellence of asthidhatu. Asthi sara purusha is described as 'kriyavantah'

Role of Majja dhatu: The important functions of majjadhatu are snehana, *Balakara*, asthi purana and sukra pushti. It imparts snigdha and *Bala* to the whole body. Majja sara purusha is described as '*Balavantah*.' C.vi.8/108]

Role of Sukra dhatu

The Sukradhatu imparts courage, pleasure, strength and elation²⁷. The excellence in functions of sukradhatu denotes the ability of a person to perform his activities well. *Bala* is an

endowment acquired by sukradhatu. The Veerya itself functions as superior among Balya. Sukra dhatu is responsible for the genetic inheritance of muscle strength and immunity. The subtle and inherent factor that triggers and completes the cell division is also a part of the sukradhatu. So excellency of sukradhatu is also very important for *Bala*.

In a nutshell it is factual that the excellence of dhatus, i.e. sara is a major indicator of *Bala*.

Agni and Bala: The Jataragni which digests the ingested food, the bhuthagni which assimilates their substrates into the respective bhuthadravya and the dhathwagnis responsible for the formation of each particular dhathu-all play their role in promoting *Bala*. Therefore life, colour, strength, health, enthusiasm, growth and development are based on proper Agni. It is said that 'Agnimoolam *Balam* pumsam.' Agni is the root of *Bala* and hence all efforts are to be done for protection of agni. If agni is in *Prakruta* avastha then prolonged healthy life span is the result, if it is vikruta then it leads to disease and if agni is lost then it leads to death. Samagni leads to drida gastrata and ojovruddhi. So it is said that agni is the moola for *Bala* and *Bala* is the moola for jeevana²⁸. In nutshell principle of chikitsa is agni parirakshana.

Ojas: Susrutha has used the term *Bala* to signify *Ojas* and states that *Bala* is the power sufficient to resist diseases. *Ojas* is the essence of all dhathus and possesses qualities like snigdha, seeta, madhura sara, mridu, mritsna²⁸. Accumulation of these properties from the early stages of life bestows *Ojas*. *Ojas* keeps all living beings refreshed. There can be no life without *Ojas*. Some scholars consider it as the eighth dhathu. *Ojas* and dhathus are separately mentioned- due to its importance in the protection of vital energy²⁹. The mention of para *Ojas* of quantity of 8 drops located in the heart and that of apara *Ojas* situated in vessels attached to the heart and circulates the body denotes *Ojas* as a material energy. When it transforms into action- of protection, preservation and maintenance, it is called *Bala*.

CD4 percentage

The immune system comprises various specialized cells that defend the body against infections. Among these, CD4 cells- also known as helper T-lymphocytes-play a crucial role. CD4 is a glycoprotein expressed on the surface of T-helper cells, a subtype of white blood cells responsible for coordinating immune responses. These cells detect infected or abnormal cells by recognizing pathogen-derived protein fragments displayed on the surface of such cells. Once an infected cell is identified, CD4 cells do not directly kill it; rather, they activate and direct other components of the immune system to respond.

T-lymphocytes are broadly classified into two major types based on their surface markers: CD4 and CD8 cells. While CD8 cells, or cytotoxic T-cells, directly kill virus-infected or tumor cells, CD4 cells act more as immune coordinators. They help initiate antibody production and activate macrophages to engulf and destroy pathogens. Because of this, CD4 cells are often referred to as "helper" cells. In addition to their role in immune activation, CD4 molecules also function as co-receptors alongside the main T-cell receptor, enhancing antigen recognition and subsequent immune response. CD4 is particularly well-known due to its association with HIV infection, as the virus specifically targets and depletes CD4+ T-cells, weakening the immune system and increasing vulnerability to infections.

Lymphocytes, including T-cells, possess a wide array of surface molecules identified through their reactivity to monoclonal antibodies. These surface markers are categorized into clusters of differentiation (CD), such as CD1, CD2, CD4, CD8, etc. The CD classification system helps in identifying and understanding the specific roles of immune cells. CD4 and CD8 molecules, in particular, are essential components of the T-cell receptor complex and are indispensable in antigen recognition and signaling during immune responses.

CD4 count refers to the number of CD4+ T-cells per cubic millimeter of blood and serves as a critical marker of immune competence. Clinically, it is used to assess immune function, monitor susceptibility to opportunistic infections, and diagnose the progression to AIDS-defined by a CD4 count falling below 200 cells/mm³. A normal CD4 count typically ranges between 500 and 1500 cells/mm³. This count helps in evaluating the immunological status of individuals, especially in conditions like HIV/AIDS, autoimmune disorders, or immunosuppressive therapies.

Helper T-cells are the most abundant subset of T-cells, often comprising more than 75% of the total T-cell population. Their role extends beyond basic immune support; they serve as the primary regulators of nearly all immune responses. They exert this function by releasing a series of signaling molecules called lymphokines, which influence other immune cells and bone marrow activity. Among the key lymphokines secreted by CD4+ T-cells are interleukins (IL-2, IL-3, IL-4, IL-5, IL-6), granulocyte-monocyte colony-stimulating factor, and interferon-gamma (IFN- γ). These mediators promote immune cell proliferation, differentiation, and activation, ensuring an effective and regulated immune defense³⁰.

DISCUSSION

The concept of immunity is deeply embedded in Ayurvedic literature, encompassing understanding of disease resistance and health preservation. This integrated approach may be aptly termed as 'Ayurvedic immunology'. Just like the modern medical science, Ayurveda has classified the '*Bala*' into two main types, such as - *Sahaja* (natural or innate) and *Yuktikruta* (acquired or induced). There is also a third type of '*Bala*' known as *Kalaja* which varies according to the difference in season and age of the individuals³¹. The modern sub-divisions of natural immunity, such as species immunity, racial immunity and individual immunity may also be incorporated in Ayurveda in reference to *jatiniyata*, *kulaniyata*, and *pratyatmaniyata prakritis* respectively where Charaka says that inter individual variations are dependent upon the variation of species, race, climate, season, age and personal habits³². While defining the term '*Prakruta* or '*Sahaja*', Chakrapani holds the views similar to Wilson and Miles that the term *Prakruta* or innate would indicate that the response to an infection was determined solely by the inherited qualities of the animal and was not influenced by any prior events in its life time. According to Ayurveda *yuktikruta Bala* is that which is obtained by means of nutritive diet, proper mode of life activities, and certain vitalizing (*urjaskara*) medicines like, *rasayana* and *vajikarana* etc³³. It is a well-known fact in modern medical sciences that diet rich or poor in proteins, vitamins and minerals and also the work which causes fatigue or that which demands less physical strain, certainly bring a good or bad effect on body resistance respectively³⁴. As regards to *Kalaja Bala*, it has been accepted that the variations in temperature, humidity and other physical conditions of environment play an influential role in body resistance. *Kalaja Bala* is supposed to be dissipated at its lower level in the Adana kala (*Sisira*, *Vasanta* and *Greeshma*). In *Visarga kala* (*Varsha*, *Sarat* and *Hemanta*), *Bala* is stated to be conserved³⁵.

Integrity of human system is maintained by the synchronization of functions of subsystems, which are organically interconnected and biologically regulated by the *Thridosha*. Three systems are said to be very important as far as the homeostatic functions are concerned. These three systems are nervous system, endocrine system and immune system which are called great coordinating systems, which can exactly be correlated with *Vata*, *pitta* and *Kapha* respectively. While describing the individual incapable of resisting diseases, Acharya Charaka, has given greatest importance to three dhatus like *mamsa*, *sonita* and *asthi*³⁶. Healthy condition, especially of these three dhatus are responsible for *vyadhikshamatwa*, which reflect the equilibrium of *Thridosha*.

Based on *Ashraya ashrayi* relationship, *Mamsa* is the abode of *Kapha*, *sonita of pitta* and *asthi* for *Vata*³⁷.

Out of five divisions of *Vata*, *Udana Vata* is related with *Bala*. In *udanavrita prana*, there is loss of activities, *Ojas*, *Bala* and *Varna*. The attributes of *Sleshma* is cohesion, union, and integration. Immune system and other protective mechanisms in the body have been grouped under *Kapha* in Ayurveda. *Prakruta* (normal) *Kapha* is *Bala* and it is also called *Ojas*.

Avalambaka Kapha situated in thorax, protects the 'trika' and other vital structures like heart through *ambukarma*. One of *ambukarma* attributes to lymphatic drainage. All structures in the body are provided with lymphatic drainage through which any antigens/microbes/toxins are taken to lymph nodes or to other lymphoid tissues where the lymph is filtered. From the bone marrow lymphocytes are taken to thymus gland; maturation of T-lymphocytes takes place. These matured T-lymphocytes are taken to all other lymphoid tissues, like those of tonsils, GALT, spleen etc. where they are stored. All other sites, where other types of *Kapha* are situated are associated with one or the other kind of lymphoid tissue or at least with some special immune mechanism. *Ambu*, *Kapha* and *Ojas* are *somatmaka* which are interrelated, which in turn related to *Bala*.

Kledaka Kapha present in stomach and upper small intestine is associated with Gut Associated Lymphoid Tissue (GALT). *Bodhaka Kapha* is said to be present in oral cavity and Tonsils are the important lymphoid tissue -containing structures present there. *Tarpaka Kapha* is present in siras and BBB, CSF, microglia are associated with this *Kapha*. *Sleshaka Kapha* is present in bony joints. These joints are the sites of prominent inflammation in most of the systemic autoimmune diseases like systemic Lupus Erythematosus, RA (Rheumatoid Arthritis) etc.

Acharya Susruta says that '*nasti Kaphascha puya*: while dealing with the process of inflammation, which is leading to formation of puya (pus), stated that the material of puya is derived from *sleshma/Kapha*. Pus is a thick fluid that contains living as well as nonliving WBC plus debris from other dead tissue along with dead bacteria. When the virulence of invading agent is pronounced, they paralyse the leucocytes with their toxins, and invade the blood stream, spread through the body to fatal result. This modern concept strengthens the statement that *sleshma* represents the defense system of the body. Leucocytes can be considered as a part of the *Kapha* organization of the body. *Prakruta sleshma* is also called *Ojas*. So leucocytes can be considered as part of *Ojas* and through defense mechanism, it maintains the stability of the body.

T lymphocytes expressing CD4 are also known as helper

T cells. CD4 count reflects the health condition of our immune system. CD4 cells are responsible for signaling other immune system cells to fight an infection in the body and these are regarded as being the most prolific cytokine producers. The higher the CD4 count, the stronger the immune system. Too few CD4 cells indicate that the immune system will no longer function like it is supposed to.

In Ayurveda, *Bala* is described in a wide canvas; one aspect of it is resistance against diseases (*vyadhi kshamatwa*). The normal state of *Kapha* yields strength (*Bala*) and also represents the immune mechanism of the body. *Ojas* has been described to exist in different forms in the body. *Prakrutha Kapha* which is also called *Ojas*, prevents its decay and degeneration. The fraction of *Ojas* which circulates all over the body through the cardiovascular system, moves along with *rasadhatu*. It is called '*Rasatmaka Ojas (slaishmika Ojas)*'. *Rasa dhatu* includes both plasma and lymph. Complement system and antibodies circulating in the intravascular compartment can be included in this. Another form of *Ojas* is present in all tissues and this is called '*dhatu tejorupi*'. This indicates the immune mechanisms present at tissue level, those due to tissue macrophages, mast cells and other WBCs of tissue pool. Another form of *Ojas* known as *jivasonita rupi* is particularly associated with blood cells, especially with leukocytes. The *jivasonita roopa Ojas* represent the cellular theory of immunity. Similarly the *rasa-rupa Ojas* is representative of humoral theory of immunity.

CD4 is the surface molecule of T lymphocyte, which is the subtype leucocytes present in the blood. It is a glycoprotein in structure, and acts as co-receptor. Immunologically, the cytokines that orchestrate the growth, development, differentiation of blood cells, cells of lymphatic system and it enhances the activity of CD8+ cytotoxic T cells and activate macrophages and natural killer cells. The cytokine release is mediated by CD4+ T helper cells. CD4+ T helper cell is analogous to part of '*Jeevasonita rupi Ojas*' which helps to maintain the stability of the body. *Rakta* is predominantly *agneya* and *Jeevasonitarupi Ojas* situated in *Rakta* has *thaijasa bhava* in karma. Action of cytokines reflects the *thaijasa bhava* karma of *Jeevasonita rupi Ojas*.

Bala is one of the effects (*karya*) of *Ojas*. Due to their close functional relation, *Bala* acts as an indicator of *Ojas* in the body. Immunity, the ability of body to resist against disease causing organism, is one of the functions of *Bala*, which in turn can be one of the strong indicators of *Ojas*. CD4+ T cell count is low in AIDS and Tuberculosis. In Ayurveda these diseases are considered as *ojokshayajanya vikaras*. CD4 percentage is an important parameter for assessment of *Bala*. In a nutshell, in

an individual, *Ojas* is the base for *Bala* and *Bala* is the base for *Arogya*. If these factors are in harmonious physiological state, the person will never be easily afflicted by any *Dosha* vitiation.

Conclusion

Bala, as described in Ayurveda, encompasses a multidimensional view of strength, integrating humoral, metabolic, enzymatic, genetic, nutritive, and psychological aspects of health. Its foundation lies in the proper functioning and transformation of *Dosha*, *Dhatu*, and *Mala*, all of which are ultimately sustained by *Ojas* (vital essence). In modern immunological terms, this concept finds resonance in the functioning of CD4+ T helper cells, which orchestrate immune responses by regulating macrophages, B cells, and cytotoxic T lymphocytes through cytokine signaling. The dual manifestations of *Ojas-Rasa-rupi* (humoral) and *Jeevasonita-rupi* (cellular) align with the two major arms of immunity, highlighting a striking convergence between ancient Ayurvedic theory and contemporary biomedical science. CD4 percentage, as a measurable marker of immune competency, particularly in immunocompromised conditions like HIV and tuberculosis, serves as a practical indicator of *Bala* in clinical settings. Thus, understanding *Bala* through both classical and modern lenses deepens our appreciation of health as a state of dynamic equilibrium and resistance to disease. Maintaining *Bala* through the preservation of *Ojas* and observance of *Swasthavritta* remains central to achieving and sustaining *Arogya*.

References

- Shao T, Verma HK, Pande B, Costanzo V, Ye W, Cai Y, Bhaskar LV. Physical activity and nutritional influence on immune function: an important strategy to improve immunity and health status. *Frontiers in physiology*. 2021 Oct 8;12:751374.
- Jadavji Trikamji. Charaka Samhitha of *Agnivesa* with ayurveda Dipika commentary of chakrapanidatta. Reprint edition. Chikitsa sthanam. 3/142. Chowkambha Sanskrit series, Varanasi; 2021.409p.
- Rasavaisheshika. Chapter 1. In: Narasimha K, editor. *Rasavaisheshika Sutra with Bhāṣya*. Varanasi: Chaukhamba Orientalia; 2003.
- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/19 Choukhamba Orientalia. Varanasi. 2017. 104p
- Beisel WR. Overview of the Immune System and Other Host Defense Mechanisms. In: *Nutrition and Immunity*. Chapter in NCBI Bookshelf. National Center for Biotechnology Information (US); 2024.]
- [Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Sutra sthanam. 28/7. Chawkhamba Orientalia, Varanasi; 2021. 178 P.
- Swain SL, McKinstry KK, Strutt TM. *Expanding roles for CD4+ T cells in immunity to viruses*. *Nat Rev Immunol*. 2012;12(2):136–148.
- Luckheeram RV, Zhou R, Verma AD, Xia B. CD4+ T Cells: Differentiation and Functions. *Int J Biomed Sci*. 2012;8(1):26–35.
- KR Srikantamurthy. Vagbata Ashtanga hrudaya . Chikitsa sthana. 1.99 Chawkhamba Orientalia, Varanasi; 2021.173p
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Sutra sthanam. 11/36. Chawkhamba Orientalia, Varanasi; 2021. 74p.
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Chikitsa sthana. 24/68. Chawkhamba Orientalia, Varanasi; 2021. 576p.
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. vimana sthana. 8/94. Chawkhamba Orientalia, Varanasi; 2021. 276p
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. sharira sthana . 6.13. Chawkhamba Orientalia, Varanasi; 2021. 332p
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. chikitsa sthana. 16/4. Chawkhamba Orientalia, Varanasi; 2021. 526 p
- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/22 Choukhamba Orientalia. Varanasi. 2017. 105p
- KR Srikantamurthy. Vagbata Ashtanga hrudaya. sutra sthana. 12.5-6 Chawkhamba Orientalia, Varanasi; 2021.167p
- KR Srikantamurthy. Vagbata Ashtanga hrudaya. sutra sthana. 11.1-3 Chawkhamba Orientalia, Varanasi; 2021.155p
- KR Srikantamurthy. Vagbata Ashtanga hrudaya. sharira sthana. 3.52 Chawkhamba Orientalia, Varanasi; 2021.404p
- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/3 Choukhamba Orientalia. Varanasi. 2017. 98p
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. sutra sthana. 17/117. Chawkhamba Orientalia, Varanasi; 2021. 105 p
- KR Srikantamurthy. Vagbata Ashtanga hrudaya . sutra sthana. 11. 3 Chawkhamba Orientalia, Varanasi; 2021.155p
- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 14/12 Choukhamba Orientalia. Varanasi. 2017. 89p
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- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/5 Choukhamba Orientalia. Varanasi. 2017. 98 p
- PV Sharma. Susruta samhitha Dalhana commentary, Reprint edition. sutra sthana . 15/19. Chawkhamba Orientalia, Varanasi; 2014. 71p.
- Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. sutra sthana. 24/3. Chawkhamba Orientalia, Varanasi; 2021. 124p
- K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/5

- Choukhamba Orientalia. Varanasi. 2017. 98 p
28. K R Srikantha Murthy. Illustrated Susruta Samhita, text with English translation. Reprint edition. Volume I. suthrasthana. 15/22 Choukhamba Orientalia. Varanasi. 2017. 105p
 29. Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. sutra sthana. 28.4. Chawkhamba Orientalia, Varanasi; 2021. 175p.
 30. Roitt, Brostoff, Male. Textbook of immunology. 6th edition
 31. Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Sutra sthanam. 11.36 Chawkhamba Orientalia, Varanasi; 2021.74 p
 32. Acharya Charaka. Charak Samhita Edited by Charak Chandrika Hindi commentary by Dr. Brahmanand Tripathi, Indriya sthana 1/5. published by Chaukhamba Surbharati Prakashan, Varanasi. 987p.
 33. Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Sutra sthanam. 11.36 Chawkhamba Orientalia, Varanasi; 2021.74p.
 34. Calder PC. *Nutrition, immune response and outcome*. Infect Dis Clin North Am. 2017;31(2):245–260.
 35. Kaviraja atrideva gupta. Vagbatas Ashtanga Hrudayam vidyotini hindi commentary Reprint edition. Sutrasthana. 3/5-7. Chowkambha Sanskrit series, Varanasi; 2015.34p.
 36. Jadavji Trikamji. Charaka samhitha with Chakrapanidutta Ayurveda Dipika commentary. Reprint edition. Sutra sthanam. 28.7 Chawkhamba Orientalia, Varanasi; 2021.178 p.
 37. Kaviraja atrideva gupta. Vagbatas Ashtanga Hrudayam vidyotini hindi commentary Reprint edition. Sutrasthana. 11/26-28. Chowkambha Sanskrit series, Varanasi; 2015.117p.

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