

Critical Appraisal of Immunity in Ayurveda

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Abstract

During certain conditions or factors, even unwholesome food does not produce disease immediately. The variety of unwholesome food is not equally harmful in causing disease; all dosas are not equally powerful, and variations in physique and mind play a role in resisting disease. Variances in several genes can influence how well a patient might respond to a particular drug or antigen. Resistance to disease or immunity against disease is of two kinds i.e. one that attenuates the manifested disease and the other prevents the manifestation of disease. The above concept indicates an individualistic approach in disease management. Personalized medicine is the new paradigm of modern medicine, aiming to predict the risk and treatment of disease on the basis of a person's genetic profile, which would render biologic consideration of race obsolete. But it seems unwise to abandon the practice of recording race when we have barely begun to understand the architecture of the human genome, and its implications for new strategies for the identification of gene variants that protect against, or confer susceptibility to common diseases, and modify the effects of drugs. In the international context, the concerns on personalized medicine are more obvious and advanced. It creates a new framework in terms of prompt and individualized diagnosis and treatment of the patient. Homeostasis of Ojas, agni, srotas, doshas, and dushya, along with and associated, is the pleasant state of soul, sensory organs, and mind, essential for good health. Proper use of food, sleep and celibacy is the golden triangle for excellent health. There is a great deal of synergy between Ojas, agni, srotas, doshas, and dushya; defects in either system can lead to immune-pathological disorders, including autoimmune diseases, immune-deficiencies and hypersensitivity reactions.

Keywords: *Ojas, Agni, Srotas, Dosha, Dushya, Bala*; Immunity; Mucosal surfaces

Introduction

During certain conditions even unwholesome food does not produce disease immediately. All unwholesome food is not equally harmful, all *dosas* are not equally powerful, and variations in physique and mind play a role in resisting disease. Resistance to disease or immunity against disease is of two kinds i.e. one which attenuate the manifested disease and other prevents the manifestation of disease [1].

Any unwholesome food substance is not equally powerful in causing disease

Unwholesome food substances become more harmful depending upon the nature of the locality, time, combination, potency, and excessive quantity of intake. For example, *vrihi* type of corn is unwholesome because it aggravates *pitta*. The same becomes more unwholesome if consumed by marshy land (*anupadesha*) people and the same is less harmful if consumed by desert land (*dhanvadesha*) people. Corn is more unwholesome during *sharadritu* (autumn season) and less harmful in *hemantaritu* (winter season). If *phanita* (penidium or sugarcane juice) consumed with curd, it becomes more unwholesome and the same becomes less harmful if consumed with honey. When consumed hot it is more unwholesome and the same taken cold is less harmful. If consumed more in quantity it becomes more unwholesome and less harmful if consumed less in quantity [1].

Doshas of all types are not equally strong in producing disease

Imbalanced *dosas* are exceedingly painful, acute and difficult to cure in multiple combinations, if they require mutually contradictory therapies, if they are deep seated i.e. involving deeper *dhatu* like *majja* etc. in the pathogenesis of disease. If disease is chronic it becomes very difficult to cure because the *doshas* are deep seated and causes displeasure in the mind. If *dashapranayata* (ten seats of *prana*) are involved in the disease process along with other vital organs like *hridaya* (heart) etc., then disease become difficult to cure. If vital organs are afflicted, then disease becomes difficult to cure. If disease manifests instantaneously, it indicates that the disease is very difficult to cure [1].

Variations in physique and mind play a role in resisting disease

People vary from one another in many ways, some may be obese or overweight; excessively emaciated; with muscles and blood drastically reduced; debilitated; those living on unwholesome or very little food; inferior mental faculties etc. Individuals having opposite types of physical constitution are shown to be capable of resisting diseases [1].

Food versus immunity

Wholesome food is the only sole cause for the growth of a living being. There are three factors that support life i.e. *ahara* (food), *svapna* (sound sleep) and *brahmacarya* (one who is having control over the senses and full of spiritual bliss). The body will be possessed with

strength, good complexion, growth and longer life, provided the person does not indulge in factors which deteriorate health. Consumption of proper amounts of food certainly helps the individual in bringing strength, good complexion, happiness and longevity [1].

Concept of *swasthya* in ayurveda

A person is called healthy or *swastha*, if he possesses an equilibrium state of the *doshas* (body humors), *agni* (bio-digestive fire), *dhatu*s (tissues), and *malas* (waste products of body) associated with a pleasant state of soul, sensory organs and mind. It is the basis for normal immunity. Disequilibrium or derangement of *doshas* etc. causes diseases.

Doshas versus immunity

Proper elimination of waste products, equilibrium state of *dhatu*s and *doshas*, normal appetite, proper perception of taste, digestion of food in a stipulated period and proper absorption/assimilation to nourish the body, sound sleep, coordinated sensory perception, and good humor/temperament, all, indicate a healthy person. *Vata*, *pitta* and *kapha* are physical *doshas* i.e. *sharirika doshas*, and *raja* and *tama* are the mental doshas i.e. *manasika doshas*. It is very difficult to understand the movements of wind, sun and moon, similarly the activities of *vata*, *pitta* and *kapha* are difficult to ascertain. A physician must ascertain the various states of doshas i.e. diminution, aggravation, equilibrium and occlusion of *doshas* before prescribing therapeutics. *Dosha*, *dhatu* and *mala* are the main factors for the foundation of the body, that is why knowledge of these is very important. The body is firmly supported by *vata*, *pitta* and *kapha* doshas, which are situated in the lower, middle and upper portions respectively. *Doshas* support the body just like a house is supported by three pillars. They are called pillars because they support and maintain the firmness of the body. *Doshas* are also called *dhatu*s because they support the body. *Doshas* are also called *malas* due to their vitiation property. One that pollutes the body is called *mala*, being the waste product of food, and so also equated to *doshas* due to their tendency to vitiate others [2]. The *doshas* may be termed as antibodies because these identify and neutralize foreign objects such as bacteria, fungus, parasites and viruses.

Role of normal *vata* in immune system

Vata supports the body by performing functions like movement, perception, filling, separation and retaining. The normal functions of *vata* are enthusiasm, inspiration, expiration, movements, normal formation of *dhatu*s, and proper eliminations of excreta. When *vata* combines with *agni*, it produces heat but in combination with *soma* (*kapha*) produces cold, that is why it is called *yogavahi* (synergist) [2].

Role of abnormal *vata* in causing diseases

Abnormal *vata* generates various afflictions to the body, thereby producing various diseases. It affects the strength, complexion, happiness and longevity. It disturbs the functions of mind, afflicts all sense faculties, deforms and destroys the embryo for long periods of time. As a result it gives rise to fear, grief, confusion, anxiety, excessive delirium, and finally stops the vital breath. Abnormal and vitiated *vata* causes derangement of the immune system that produces diseases. Hence Ayurveda states that this *dosha* is the prime because it controls all body systems.

Role of normal *pitta* in immune system

Pitta supports the body by performing functions such as coloring, digestion, production of *ojas*, vision, intelligence, body temperature, along with other functions of *agni* that are of five types. The normal functions of *pitta* are clarity in vision, good digestion, regulation of body temperature, hunger and thirst; softness in body parts, luster, happiness and intelligence [2].

Role of abnormal *pitta* in causing diseases

Agni is represented by *pitta* in the body and produces good or bad effects depending on its normal or abnormal state, i.e. digestion or indigestion, vision or loss of vision, normal or abnormal temperature, normal or abnormal complexion, valor or fear, anger or joy, confusion or clarity, and other such dual functions [2]. Abnormal and vitiated *pitta* greatly disturbs the digestion and metabolism leading to development of diseases.

Role of normal *kapha* in immune system

An equilibrium state of *kapha* promotes strength that is why normal *kapha* is called *ojas*. Hence it is the master of the human immune system. Functions of normal *kapha* are like that of *ojas*. *Kapha* supports the body by performing functions like binding of joints, unctiousness, healing, saturation, giving strength and stability to the body and such other functions of water, and it is of five types. The normal functions of *kapha* are unctuousness, cohesion, firmness, heaviness, potency, strength, forbearance, patience and absence of greed [2].

Role of abnormal *kapha* in causing diseases

Soma, which is represented by *kapha*, gives rise to good or bad effects depending on its normal or abnormal state i.e. firmness or laxity, plumpness or emaciation, enthusiasm or laziness, potency or impotency, knowledge or ignorance, understanding or confusion, and such other dual functions [2]. Abnormal and vitiation of *kapha* greatly alters the immune system resulting in disease.

Importance of *doshas* in the development of diseases

Doshas, if aggravated, manifest signs and symptoms in accordance with the degree of aggravation i.e. excessive, moderate and slight aggravation of the *doshas* reflect itself in the form of excessiveness, moderateness and slightness (weakness) in the signs and symptoms. *Doshas*, if diminished manifest signs and symptoms in a feeble manner or cease to manifest even their normal signs and symptoms. Diminished state of *doshas* is not capable of vitiating other *dhatu*s, as a result disease will not manifest. But once *doshas* cease their normal functions, it will disturb the entire physiological functions and as a result, may cause disease or may not be capable to counteract the pathogenic causative agents thus also resulting in disease. An equilibrium state of *doshas* where there is normal function, represents a healthy state of body and mind. Sixty-two varieties of permutation and combination of *doshas* definitely manifest symptomatology [2]. *Doshas* recognize a unique part of the foreign target and tag a microbe or an infected cell for attack by other parts of the immune system, or can neutralize its target directly and attach them to prevent the manifestation of diseases. Three different *doshas* are known in mammals, which perform different roles, and help direct the appropriate immune response for each different type of foreign object

they encounter. There is a great deal of synergy between the three *doshas* and defects in either *doshas* can provoke illness or disease, such as autoimmune diseases, immunodeficiency disorders and hypersensitivity reactions.

Dhatu versus immunity

Total of seven *dhatu* (tissues) are mentioned in the Ayurvedic texts i.e. *rasadhātu*, *raktadhātu*, *mamsadhātu*, *medadhātu*, *asthidhatu*, *majjadhātu*, and *shukradhatu*. All the above seven *dhatu* support and nourish the body [3].

Functions of each *dhatu* are as follows [3]:-

Rasadhātu: Provides sense of satisfaction and nourishment; supplies nutrition to *raktadhātu*.

Raktadhātu: Bestows color, sustains life activities and supplies nourishment to *mamsadhātu*. Normal blood promotes strength.

Mamsadhātu: Covers and nourishes the body, produces waste products and supplies nourishment for *medadhātu*.

Medadhātu: Bestows moistness in the eyes and other body parts, lubrication, stability and supplies nourishment to *asthidhatu*.

Asthidhatu: Supports the body with structure, helps with posture and supplies nourishment to *majjadhātu*.

Majjadhātu: Provides lubrication and strength, fills the cavities of bone, and gives nourishment to *shukradhatu*.

Shukradhatu: Bestows courage, ejaculation, lust, strength, pleasure, love, happiness, and production of foetus.

Nourishment is intrinsic to life and an important tool in the fight for survival against pathogenic microorganisms. Whenever the expression or function of one of these tissues is impaired (provided the function is non-redundant), immune disturbance occurs and develops diseases i.e., *dhatupradoshajavikara*.

Mala versus immunity

Purisha (stools) provides strength and supports *vata*, *agni* and *pitta*. *Mutra* (urine) fills the urinary bladder and eliminates excess moisture in food. *Sweda* (sweat) provides moistness and softness to skin and supports hair [4]. Hence proper elimination of the *malas* indicates good health, and any abnormality is the cause of disease development i.e. *malapradoshajavikara*.

Agni versus immunity

Power of *agni* or normal condition of *agni* is responsible for strength, health, longevity and vital breath. For this reason it should be protected by proper intake of food and drinks because these act as a fuel. When deprived of food and drink, *agni* becomes disturbed. *Jatharagni* is the main principle substance responsible for disease and health. During its normalcy it is responsible for longevity, complexion, strength, health, enthusiasm, build, luster, immunity (*ojas*), temperature, additional *agni's* (*bhutagni* and *dhatvagni*) and other vital functions. Any abnormality in *agni* will evolve in the *rasavahasrotas* and as a result, disease manifests like clouds in the sky that bring rain. In the same way abnormality in *doshas* also manifest diseases. *Jatharagni* is the chief among all the agnis because the functions of *bhutagni* and *dhatvagni* are dependent upon *jatharagni*.

Aggravation or diminution of *jatharagni* results in aggravation or diminution of *bhutagni* and *dhatvagni*. Therefore by all means, if one wishes for longevity and strength, one has to protect *jatharagni* by consuming a suitable wholesome diet with a healthy lifestyle. On the contrary one, who consumes an unwholesome diet due to greed, succumbs to disease with the vitiation of *grahani* (disturbances in gastrointestinal tract). Irregular digestion and metabolism causes imbalance in the *dhatu*s. An intense digestion and metabolism with less consumption of food leads to depletion of *dhatu*s. It is a question of debate to say *pitta* and *agni* are one and the same. Is there any separate *agni* other than *pitta*? Or is *pitta* itself *agni*? *Sushruta* stated no separate *agni* is found other than *pitta*. It is due to the properties of hotness in *pitta* that lead to burning, cooking and such similar functions considered as *agni* itself, called *antaragni*. During a diminished state, the use of drugs having similar properties to *agni* is advised, and during an increased state resorting to cold treatments have been advocated; no mention of *agni* on this matter is found in the texts [5]. Most of the diseases develop due to deranged state of *agni*.

Ojas versus immunity

Ojas is the essence of *rasadhidhatu*s and is called *bala* (strength or power). Strength gives stability and maintains compactness of muscles, energy to perform all kinds of activities without any hindrances, clarity in voice and complexion, and both *karmendriya* (five motor faculties) and *jnanendriya* (knowledge perceived through the five senses) perform their normal functions. Protection of wellbeing for a healthy individual is very important. Equilibrium states of *dosha*, *agni*, *dhatu*, *mala* and their functions, along with proper co-ordination between soul, sense organs and mind is called *svastha*. The qualities and functions of *ojas* are similar to *shlesma* (*kapha*).

Ojas is of two type's viz. *para* and *apara*. *Para ojas* is located in the heart and measures 8 drops while *apara ojas* is spread all over the body and measures half an *Anjali* (one handful). *Ojas* corresponds to the immune function of the body. *Ojas* is the final essence of all *dhatu*s, similar to *kapha* and provides *sharirika* (physical) and *manasika* (mind) *bala* that help in fighting against disease. Avoiding all factors that cause unhappiness or mental worries and meticulously taking proper diet and drugs that are conducive to the heart *ojas* and *srotas* (micro channels) maintains *ojas*. Superior quality *ojas* is situated in *hridaya* and its quantity is eight drops. The other type of *ojas* is ordinary, dwelling in vessels attached to the heart and its quantity is half an *anjali*. *Ojas* is the essence of *saptadhātu* and it is the seat for strength. *Dhatugraha* refers to *dhatuvahasrotas* (tissue channels). It is also called *ojovahasrotas* as stated by *Cakrapani*. *Ojas* is the essence of *saptadhātu* and it is the *mala* of *shukra* (reproductive essence). *Ojas* is the *upadhātu* (secondary tissue) of *shukra*. *Ojas* is the waste product of *shukradhatu*. The seat of *ojovahasrotas* is *hridaya* along with the blood vessels attached to it; ten vessels attached to the heart which carry *ojas* and pulsate throughout the body. During the process of *paka* (transformation of nutrients) two things are observed i.e., *mala* and *sara* (prominent tissue). *Mala* is the *malarupiojas* and *sara* is the *garbha* (embryo). If the *astabindu* (eight drops) quantity of *ojas* (*para ojas*) decreases then a person will die. On the contrary if the quantity of *ardhanjaliojas* (*apara ojas*) decreases or is vitiated, there manifests 3 kinds of abnormalities i.e. *ojokshaya* (decrease in its normal quantity), *ojovyapat* (*ojas* gets vitiated with a vitiated *dosha* and *dushya*), and *ojovisramsa* (displacement from its normal place) and as a result many diseases manifest. However, a person may die due to

ardhanjaliojokshaya (immune-deficiencies) also, not instantaneously but over a period of time [6].

Bala (strength) versus immunity

Strength is of three types i.e. *sahaja* (constitutional), *kalaja* (temporal) and *yuktikrita* (acquired). A. *Sahajabala* is an inherent characteristic property in an individual present from birth. It occurs with an equilibrium state of *doshas*. B. *Kalajabala* is dependent upon season and age. loss of strength observed in *adanakala* (hot and dry), gaining of strength observed in *visargakala* (cold and wet), and middle age considered as being full of strength. C. *Yuktikritabala* or acquired strength is attained by healthy practices related to diet, activities, and performing exercises with proper methods by having rest in between different exercises etc. Some consider yoga as a *rasayan* therapy. *Vajikaranayogas* help to acquire strength by fulfilling necessary deficiencies in insufficient *dhatu*s [1].

Immunity is intrinsic to life and an important tool in the fight for survival against pathogenic microorganisms. The human immune system can be divided into two major components: the innate immune system and the adaptive immune system. *Sahajabala* may be correlated to innate immunity. The innate immune system provides the rapid triggering of inflammatory responses based on the recognition (at the cell surface or within cells) of either molecules expressed by microorganisms or molecules that serve as "danger signals" released by cells under attack. These receptor/ligand interactions trigger signaling events that ultimately lead to inflammation. Virtually all cell lineages (not just immune cells) are involved in innate immune responses; however, myeloid cells (i.e., neutrophils and macrophages) play a major role because of their phagocytic capacity [7]. *Yuktikritabala* may be correlated to adaptive immune system. The adaptive immune system operates by clonal recognition of antigens followed by a dramatic expansion of antigen-reactive cells and execution of an immune effector program. Most of the effector cells die off rapidly, whereas memory cells persist. Although both T and B lymphocytes recognize distinct chemical moieties and execute distinct adaptive immune responses, the latter is largely dependent on the former in generating long-lived humoral immunity. Adaptive responses utilize components of the innate immune system; for example, the antigen-presentation capabilities of dendritic cells help to determine the type of effector response. Not surprisingly, immune responses are controlled by a series of regulatory mechanisms [7].

When the entire body tissues, starting from *Rasadhatu* to *Shukradhatu*, are in a fully nourished state and energy is derived from them to perform all types of physical and mental activities, that state is known as *bala* i.e. bodily energy including immunity. *Bala* is reduced due to injuries, fear complex, anger, anxiety, tiredness, reduction of tissues, and grief. In case of reduction of *bala*, heaviness and weakness of the body, wrinkling of the face, change in lustre, drowsiness, excess sleep and oedema due to imbalanced *Vatadosha*, are experienced. *Bala* is enhanced with drugs that balance *doshas* and *agni* and which encourage the enhancement of tissues. Some individuals, though they appear thin or lean have good stamina and others, though they are robust, show no active energy and that is why experts determine the grade of *bala* by the performance of activity [8].

Mucosal surfaces versus *kapha*

Mucosa covering the respiratory, digestive, and urogenital tracts; the eye conjunctiva; the inner ear; and the ducts of all exocrine glands

contain cells of the innate and adaptive mucosal immune system that protect these surfaces against pathogens. In the healthy adult, mucosa-associated lymphoid tissue (MALT) contains 80% of all immune cells within the body and constitutes the largest mammalian lymphoid organ system. MALT has three main functions: (1) to protect the mucous membranes from invasive pathogens; (2) to prevent uptake of foreign antigens from food, commensal organisms, airborne pathogens and particulate matter; and (3) to prevent pathologic immune responses from foreign antigens if they cross the mucosal barriers of the body [7]. These events may be correlated to functions of the five types of *kapha*.

Immune-complex formation versus dosha dushya sammurchana

Clearance of antigen by immune-complex formation between antigen, complement, and antibody is a highly effective mechanism of host defence. However, depending on the level of immune complexes formed and their physicochemical properties, immune complexes may or may not result in host and foreign cell damage. After antigen exposure, certain types of soluble antigen-antibody complexes freely circulate and, if not cleared by the reticuloendothelial system, can be deposited in blood vessel walls and in other tissues such as renal glomeruli and cause vasculitis or glomerulonephritis syndromes. Deficiencies of early complement components are associated with inefficient clearance of immune complexes and immune complex mediated tissue damage in autoimmune syndromes, while deficiencies of the later complement components are associated with susceptibility to recurrent neisseria infections [7]. All these events may be correlated to *doshadushyasammurchana* (disturbed *doshas* invade tissues and affect whole body in gradations) in abnormal *srotas*, and if *ojas*, *kapha* etc. perform normally then it leads to efficient clearance of immune complexes and immune complex mediated diseases.

Conclusion

Concept of *vyadhikshamatwa* (immunity) has been widely described in detail in *Ayurvedic* texts because the main goal of Ayurveda is to optimize the health an individual and cure disease. To preserve health, one has to have a strong *vyadhikshamatwa* to combat deadly etiological agents. It can be achieved by two means i.e. innate immunity resulting from a general process rather than a process directed at specific disease organisms. Factors like *sahajabala* (natural strength), *swabhavasamsiddhi* (natural factors), *bijakshetragunasampaccha* (inherent qualities) etc. decide the nature of innate immunity. Acquired immunity means the human body has the ability to develop extremely powerful specific immunity against individual invading agents such as bacteria, viruses, toxins, or even impure foreign tissues from other animals. Immunity can be enhanced by *gatraabhyanga* (body oiling), *aharasampaccha* (diet), *kalabala* (seasonal and time considerations), *yuktikritabala* (acquired immunity), *sharirasampaccha* (body regimen), *satmyasampaccha* (adaptability), *pravarasatwa* (moral strength), *youvana* (youth), *karma* (past deeds), *samharsha* (pleasant state of mind) etc. Nowadays it is becoming very difficult to manage immunosuppressive, immunodeficient, drug resistance disease, which is why it is necessary to enhance the *vyadhikshamatwa* of an individual to become resistant to any etiological agents. Equilibrium of *ojas*, *agni*, *srotas*, *dosha*, *dushya* along with the associated pleasant state of soul, sensory organs and mind is essential for good health. Regulated food, sleep and celibacy are the golden triangle for excellent health. This paper

expresses the need of an individualistic approach in patient management.

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