Foundations of Immunology in Ayurvedic Classics

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(Received 13 October 2104; revised 24 December 2014)

Abstract

Immunology today is one of the fastest growing disciplines in Medicine and Biology. Its significance has grown more because of the growing significance of immune strength and resistance against different diseases besides the emergence of a wide range of immunological diseases. It is interesting to observe that the ancient Ayurvedic texts show a vivid description of the foundations of immunology thousands of years in the past. The Ayurvedic immunology is essentially a unique pro-nature holistic science with inherent bonds with nutritional status, genetic constitution and the aging process. Ayurveda describes the bio-factor ojas which is the quintessence of all the seven dhātus of the body and is responsible for the immune strength of an individual classically known as Ojabala and Vyādhikṣamatva which refers to natural and acquired immunity. There are clear descriptions available in śaṁhitās about the three broad categories of immune disorders, namely Oja-vyāpat, Oja-visrama, and Oja-kṣaya. The texts describe Rasāyana Tantra which is one of the eight branches of Astāṅga Ayurveda. Rasāyana remedies are known to sustain micro-nutrition and promote immune strength besides retarding the aging process. The present review critically examines the available literatures to evaluate the ancient concepts of early Ayurvedic Immunology in the light of recent developments.

Key words: Bala doṣa, Immunity, Immunology, Oja-Bala, Ojas, Prakṛti, Rasāyana, Rejuvenation, Vyādhikṣamatva

1. INTRODUCTION

Ayurveda is the oldest science of life and health care in the world, its antiquity going back to the ancient Vedas. Its classical ancient knowledge-base has survived up to the modern times through a set of six authentic ancient books consisting of three pre-Christian texts namely Caraka, Suśruta and Śaṁhitās of Vāgbhaṭa popularly known as Bṛhatrayī besides three medieval texts namely Mādhavanidāna, Śāraṅgdharasamhitā and Bhāvaprakāśa collectively called Laghutrayī. These texts will reveal that Ayurveda has its own unique fundamental principles, its own biology, pathology, diagnostics, its own materia medica and principles of treatment which grant it the status of a full system of medicine.

There are three unique characteristic features of Ayurvedic medicine which provide it a distinction from conventional system of medicine. These features have now emerged as most relevant today in view of the changing paradigms of health-care systems and new knowledge-base. These features are: 1. The pronature approach, 2. The Holistic approach and 3. The personalized health-care strategy based on its fundamental prakṛti-vikṛti considerations. Ayurveda holds that our body-mind system has inherent power to tackle the causes of illness and to heal a disease spontaneously without any...
artificial intervention. Ayurvedic physicians are directed by the śāstra to respect the Nature’s effort of auto-healing and ordinarily not to use any unwanted intervention against the Nature’s process. This is called the theory of svabhāvoparamavāda and the same is the pronature approach. Ayurveda considers the whole body-mind-spirit system as a single unit and so also it offers comprehensive holistic approach in management of a disease inclusive of diet, drug and total life style management. Such an integrative holistic approach is the basic nature of Ayurveda. Prakṛti and Vikṛti both are largely genetically determined processes and are to be tackled individually because no two individuals are similar hence Ayurveda advocates the principle of ‘Puruṣam-puruṣam vikṣya’ meaning there by an individualized health care. Ayurveda has certain major strengths which have contemporary relevance and may serve as potential leads for ‘Reverse Innovation’ and Translational Studies today. Among such strengths, Ayurgenomics and Immunology seem to be really promising. Let us discuss these issues briefly to understand how these are intermingled (Sharma, 1992, Udupa, 1980, Singh, 1995-2014).

2. Ayurgenomics and Personalized Medicine

Ayurveda identifies each individual being in terms of his genetically determined make-up classically known as prakṛti in relation to the doctrine of tridoṣa and triguṇa. Deha- prakṛti is the sum total of the physique, physiology and psychology of an individual and it literally denotes Genome as known today. This is the basis of the Ayurvedic concept of critically individualized approach in clinical medicine and therapeutics of Ayurveda. Such a prakṛti is inherent and does not change in one life time although may be modified to some extent due to epigenetic factors such as life-style, environmental factors and dietetics. In Ayurvedic diagnostics a practitioner always attempts to label the prakṛti of his patient before really making the vikṛti diagnosis. The overall management of a patient is designed in relation to the tridoṣic pattern of the prakṛti and vikṛti. This age-old concept of Ayurveda is being now globally accepted in the practice of conventional medicine too. It is now universally believed that all medicines are not effective in all individuals. There is a need of detailed pharmacogenomic studies in drug development as was advocated in Ayurveda thousands of years ago¹⁰. Similarly Ayurveda considers hereditary and genetic predisposition as the primary cause of many diseases, apathyā and life-style errors being the other principal causes of illness. Thus our constitutional make-up, our health and our disease are essentially the product of our nature and our ecology i.e. our genome and epigenome intermingled intimately with each other (Diana 2012, Ghodke et al., 2011, Juyal et al., 2012, Mahalle et al., 2012, Rizzo-Sierra, 2011).

3. Immunology Today

Modern Immunology is a fast growing discipline in conventional biology and medicine. Besides its protective dimensions immunology is deeply involved in the etiopathogenesis of many major diseases. Immunological inflammation, immune degeneration of tissues and auto immune diseases are the hallmark of pathology today. Likewise immunologic knowledge has now been exploited in a big way as a tool to treat or to prevent certain diseases. Vaccines and immunization program have now brought in dramatic outcomes in certain areas of preventive community medicine as well as disease specific vaccines have shown new ways to treat difficult diseases. The emerging strength of anticancer vaccines is an example.

The immune system is a system of biological structures and processes within an organism that protects against disease by identifying and killing pathogens and tumor cells. It detects a wide variety of agents ranging from viruses to parasitic worms, and needs to
distinguish them from the organism’s own healthy cells and tissues in order to function properly. Detection is complicated as pathogens can evolve rapidly producing adaptations that avoid the immune system and allow the pathogen to successfully infect the host. To survive this challenge multiple mechanisms evolve that recognize and neutralize pathogens (Wikipedia).

Immunity is the central focus of modern immunology. Immunity is a biological term that describes a state of having sufficient biological defenses to avoid infection, disease or other unwanted biological invasion. Immunity involves both specific and nonspecific components. The nonspecific components act either as barriers or as eliminators of wide range of pathogens irrespective of antigenic specificity. Other components of the immune system adapt themselves to each new disease encountered and are able to generate pathogen-specific immunity. Ayurveda describes this defense function in a holistic manner under the terms ojabala and vyādhikṣamatva which will be explained in following paragraphs.

4. FOUNDATIONS OF IMMUNOLOGY IN AYURVEDA

The immune-compromised state of a victim i.e. depletion of vyādhikṣamatva or resistance against disease is considered a major causative factor responsible for genesis of a disease. Vyādhikṣamatva is involved in prevention of the occurrence of a new disease and it also retards the virulence and progression of a existing disease. Vyādhikṣamatva in an individual is an attribute of his inherent ojas status or vital immune strength. The so designed defensive mechanism is the basis of Ayurvedic theory of ‘svabhāvoparamavāda.’ The Ayurvedic classics describe in detail the biology of ojas status and its disorders i.e. ojabala and baladoṣa.

The Ayurvedic texts describe a unique hitherto unknown concept of ojas i.e. vital essence of the body which is responsible for biological strength including the immune strength. Ojas is the final product of tissue nourishment and is the quintessence of all the seven dhātus namely rasa, rakta, māṇsa, meda, asthi, mājjā, śukra. Suśruta describes ojas as the paramateja of the saptadhātus and as the bala or biological strength of an individual. Ojas is considered to be of two kinds namely 1. parā ojas and 2. aparā ojas. Parā ojas is subtle in nature and is in minute quantity measuring only eight drops located in the heart while aparā ojas is gross i.e. half an añjali in quantity spread all over the body. Parā ojas is a life factor and its injury and insult may lead to instantaneous death. Aparā ojas is responsible for gross biological and immune strength10-20.

5. OJABALA AND BALADOṢA

As stated above, ojas is the vital essence of our body present in the living body in varying amount and quality. Ojas is regularly formed in the body as the consequence of the digestion and tissue metabolism. This ojas material is the integral part of bodily cells and tissues. Qualitatively and quantitatively, of two kinds of ojas, parā ojas is the factor which sustains life while aparā ojas is claimed to be responsible for the immune strength technically termed as oja bala. The oja bala derived from ojas has been categorized to be of three kinds viz 1. Sahaja bala or primary natural bio-strength and immunity, 2. Kālaja bala or acquired immunity through environmental factors such as age, climate etc and 3. Yuktikṛta bala or the artificially induced acquired bio-strength and immunity11,12. The classics prompt to utilize these three resources to enhance the bala/immunity in order to prevent all ailments especially chronic wasting disorders and contagious diseases, such as Śoṣa, Kṣaya and Yakṣmā i.e. Pthisis and Tuberculosis etc.
There are three categories of Baladoṣa or disorders of bala which are comparable to three categories of immune disorders such as 1. Oja-vyāpat (immune-aberrations and allergies), 2. Oja-visṛ�sma (dislodged immunity and autoimmune disorders) and 3. Oja-ksaẏa (immunodeficiency)\(^{13-18}\). As the basic nature of these three categories of baladoṣa are specifically different there has to be different approaches to their diagnosis and treatment. In case of oja-vyāpat there is a need to curve the excessive immune response therapeutically. In case of oja-visṛ�sma where immune strength is dislodged there is a need to plan samśodhana to cleanse the channels so that the ojas is restored back to its normal site. In case of oja-ksaẏa where there is clear immunodeficiency a wise physician should administer rasāyana remedies and good nutrition to replenish the ojas system leading in turn further to improved ojabala. Enhancing bala which includes immune potency by adherence to a code of conduct including appropriate diet, physical activity and positive life-style is the core of svasthayrittā in Ayurveda. Rasāyana therapy which is an important biological aid to enhance bala i.e. immunity will be discussed later in this review.

It cannot be overemphasized that while looking at the above mentioned ancient classical descriptions on ojabala and baladoṣa it seems immunology was already highly advanced in samhitā period of Ayurveda and the knowledge in this field was almost comparable with the latest basic knowledge of immunology as known today although now the technological advances in this field have been outstanding. However it should be kept in mind that the scientists who made the new discoveries in germ theory, modern immunology, microbiome etc were unaware of Ayurveda and did their work independently. The author of this review is inclined to suggest that these modern discoveries could have been easier and faster if the modern scientists could have known the pre-existing knowledge of Ayurveda in the respective field. Reverse innovation is always less time consuming and easier because of the pre-existing leads available at hand.

6. IMMUNE DISORDERS IN SOME MAJOR DISEASES

All the three classics of Ayurveda propound the doctrine of immune-compromised state as the precursor of chronic wasting diseases like Phthisis and Tuberculosis i.e. śoṣa, ksāya and yakṣmā. Suśrūta while describing the samkrāmaka or contagious diseases specially mentions jvara or fevers, śoṣa or phthisis and yakṣmā or tuberculosis, abhiśyaṇḍa or conjunctivitis and kuṣṭha or dermatoses such as leprosy emphasizing that these diseases spread from person to person by contact. The spread of such diseases may be prevented by avoiding personal contacts and by promoting inner vyādhikṣamatva or immunity with the help of healthy life style, good nutrition and rasāyana therapy described in Ayurveda.

Besides, the Ayurvedic texts also refer to the significance of immune factors in certain diseases showing indirect evidence. Diabetes mellitus is vividly described in all Ayurvedic classics in terms of madhumēha which is one of the 20 types of Prameha. Ayurvedic disease entities are described as the outcome of interaction between doṣas and the duṣyas and the actual diagnosis and prognosis of the disease depend on the doṣa-duṣya combination. Prameha has maximum number of duṣyas indicating that it is a disease involving the whole body and as such it is difficult to cure. Interestingly ojas, which is the sheet anchor of the immune system of the body, is also counted among the duṣyas i.e. morbid factors of Prameha. It means that Ayurveda considers Diabetes as a disease involving the immune system. This factor is now being scientifically proved. Similarly āṁavāṭa, a disease which is similar to rheumatoid arthritis is described to be caused by impact of a systemic antigenic material
called āma which is a byproduct of faulty digestion and metabolism. Incidentally now a days rheumatoid arthritis is known as an auto immune disease which is an example of oja-visramsā as described earlier. There are also descriptions available to suggest that immunity is intimately linked with mind, indicative of the concept of psychoneuroimmunology in Ayurveda.

7. ANCIENT AYURVEDIC LEADS IN MICROBIOLOGY

It will be pertinent to overview the concept of microbiology and parasitology in Ayurvedic classics in the context of the immunity and body resistance as described in Ayurveda in reference to ojas, bala and vyādhikṣamatva. Though microbes and their role in pathology was not known in modern medicine before 200 years from now, Ayurveda had a good knowledge about their entity. However the knowledge was of a primitive nature. Ayurveda describes two kinds of organisms namely 1. Prākṛta or nonpathogenic, 2. Vaikṛta or pathogenic. They also described two categories of pathogens/parasites namely 1. External, 2.Internal. The internal organisms were claimed to be mainly of three categories in terms of their thriving milieu viz. 1. Those sustaining on mucus, 2. Those growing over fecal matter 3. Those growing in blood. Some of them particularly those thriving on fecal matter seem to be intestinal parasites while others simulate microbes. The texts repeatedly advocate to protect surgical wounds from these organisms. There is also a clear description about the vector borne nature of some organisms and the texts consider certain diseases such as leprosy, tuberculosis, conjunctivitis and fever as contagious diseases which spread by contact with other patients suffering from the same disease.

It is amazing that these ancient texts recognized the existence of friendly nonpathogenic organisms and their function which is now considered a great discovery in microbiology. It is claimed by modern scientists that our living body is made up of 10 trillion somatic cells and our body of 10 trillion cells provide habitat for 100 trillion friendly microbes. This empire of microbes is called Microbiome which is gradually gaining the importance almost parallel to the Genome/Epigenome phenomenon. This microbiome is like an organized organ with unique functions and hence need to be protected in the same way as we protect our other vital organs like liver, heart or kidney etc. This recognition of the existence of these friendly prākṛta nonpathogenic organisms by Ayurveda thousands of years ago is of great historical significance21-23.

8. PROMOTING OJAS-STATUS AND VYĀDHIKṢAMATVA

In view of the immune status of an individual being an important factor for conservation of health and prevention of disease, Ayurveda deliberates extensively on positive health measures such as life-style management, healthy dietetics and rejuvenation therapy with the help of a range of micro-medicinal nutrients called rasāyana. A rasāyana remedy promotes nutritional status of an individual through qualitative changes in bodily cells and tissue leading in turn to improved bodily function, promotion of health and prevention of disease as well as longevity. These rasāyanas are considered the therapeutic means of obtaining the best quality of dhātu through micro-nutrition dynamics. It is believed that a rasāyana acts at one or all of the following levels namely: 1. At the level of rasa directly enriching the nutritional value of plasma. Such rasāyanas are essentially nutrients in themselves. 2. At the level of agni some rasāyanas such as pippalī and śunthī work as digestive and metabolic boosters and lead in turn to improved nutritional status. 3. At the level of srotas some rasāyanas like guggulu and harītakī promote systemic nutrition by way of sroto-prasādana or
as promoters of micro-circulation and tissue perfusion. All such situations promote nutritional status of an individual with improved quality of cells and tissues in the body, longevity, immunity and superior health both physical and mental. In this entire process ojas is the basic matrix and all rasāyanas are supposed to be oja-vardhaka remedies. Rasāyana tantra was developed as one of the eight branches of Aṣṭāṅga Ayurveda which is comparable to nutrition science, immunology and geriatrics all interlinked together. Thus ayurvedic immunology is a continuum of vital nutrition.

**9. Dhātu-Pośaṇa, Dhātusāra and Ojas**

Ayurvedic biology swings around the holistic continuum of nutrition, agni or metabolic fire, specific sequence of formation of seven primordial tissues of the body termed as sapta dhātus – rasa, rakta, māṃsa, meda, asthi, majjā, śukra leading at the apex to the formation ojas which is the vital essence of all the seven dhātus that constitutes the vital strength and immune defense of the living body. Each dhātu has its sāra i.e. quality index which denotes the quality of the respective dhātu. The sequence of events taking place in this process are depicted below.

\[
\begin{align*}
\text{Āhāra} + \text{Agni} + \text{Intact srotas system} &= \text{Āhāra rasa} \\
&= \text{tissue nourishment and new tissue formation:} \\
\downarrow & \\
\text{Rasa} &\rightarrow \text{Rasa-sāra} \\
\downarrow & \\
\text{Rakta} &\rightarrow \text{Rakta-sāra} \\
\downarrow & \\
\text{Māṃsa} &\rightarrow \text{Māṃsa-sāra} \\
\downarrow & \\
\text{Meda} &\rightarrow \text{Meda-sāra} \\
\downarrow & \\
\text{Asthi} &\rightarrow \text{Asthi-sāra} \\
\downarrow & \\
\text{Majjā} &\rightarrow \text{Majjā-sāra}
\end{align*}
\]

**Śukra → Śukra-sāra**

**Ojas - 1. Parā ojas, 2. Aparā ojas → Ojabala = Vyadhikṣamatva = Immunity**

**10. Rasāyana Therapy and Rejuvenation**

Ayurveda even during the classical age was a fairly developed medical and health science. It had eight specialty branches, hence Ayurveda is called Aṣṭāṅga ayurveda even today. The eight classical branches of Ayurveda are 1. Kāyacikitsā (Internal Medicine), 2. Śalya tantra (Surgery), 3. Śālākya tantra (ENT and Ophthalmology), 4. Kaumārabhṛtya (Pediatrics and Gynecology), 5. Rasāyana tantra (Immunology and Geriatrics), 6. Bājikaraṇa tantra (Sexology and Reproduction), 7. Agada tantra (Toxicology) and 8. Bhūtavidyā (Psychiatry and Demonology). Out of these eight branches, Rasāyana tantra is the branch which deals with immunology and geriatrics.

The term rasāyana (rasa+ayana) essentially refers to acquisition, movement or circulation of nutrition needed to provide nourishment to the bodily cells and tissue. This phenomenon is considered conducive to the promotion of the qualities of dhātus i.e. bodily cells and tissues. The improved nutritional status and the better qualities of dhātus lead in turn to a series of secondary attributes of rasāyana such as longevity, immunity, improved mental and intellectual competence. As stated above it is presumed that the rasāyana agents promote nutrition through one or all of the three modes at the level of rasa, agni and srota, meaning there by that some rasāyanas are nutrients in themselves, while certain others are metabolic boosters and some others are the agents which cleanse the micro-channels and augment microcirculation of nutrients in the body, the net result of all the three being the improved nutritional status. Thus Ayurvedic immunology
conceives a bond between micro nutrition with immune enhancing effect because according to Ayurveda ojas is the basic matrix of immune system and ojas is the supreme outcome of the process of nourishment in the living body. Thus nutrition, microcirculation and immunity are intimately linked. This is the concept of Holistic Ayurvedic Immunology. Hence Ayurveda advocates for better nutrition, richer ojas system, stronger agni and competent microcirculation in order to have good immune strength. Ayurveda does not separate the immune strength from the total bio-strength.

11. CLASSIFYING RASAYANA REMEDIES

Classically the Rasāyana remedies and therapy procedures are categorized as below;

1. In terms of the scope of use rasāyanas are of two kinds – a) Kāmya rasāyanas which are used in apparently healthy individuals for the purpose of positive health care. Such rasāyanas again may be of three kinds namely 1. Srikāmya rasāyanas which are supposed to promote luster of the physical body, 2. Prāṇakāmya rasāyanas which are used to achieve healthy longevity. 3. Medhākāmya rasāyanas which are claimed to be specific for promotion of mental health and cognitive ability. b) Naimittika rasāyanas which are used in diseased individuals for the purpose of imparting defensive power in a patient to be able to fight with the existing disease. They are supposed to be disease specific rasāyanas. The classical examples given in the classical texts are the use of Śilājatu rasāyana for patients of Diabetes mellitus and Tubaraka Rasāyana for the patients of Leprosy.

2. In terms of the procedures to be adopted in administration of rasāyana therapy the procedures are of two kinds, namely a) Vātatāpika rasāyana therapy which is used outdoor without adopting any kind of intensive regimen, b) Kuṭiprāveśika rasāyana procedure where the patient is placed under an intensive regimen admitting the patient in a specially designed trigarbhā rasāyana kuṭī or therapy
chamber where he first undergoes pañcakarma therapy to cleanse bodily channels and then he consumes the rasāyana remedy chosen for him in consideration of his age, his prakṛti, the climate, weather and many other influencing factors. The patient remains on therapeutic diet and prescribed life style for the prescribed duration of time. This intensive rasāyana therapy is believed to rejuvenate the body-mind system of the patient described as Rejuvenation or Kāyākalpa.

3. In terms of the therapeutic modalities, the rasāyana therapy has been described to be of three kinds namely a) Ācāra rasāyana which is essentially an adravyabhāita non-medicinal positive life style regimen and it is claimed that the prescribed positive life itself may produce all the expected benefits of rasāyana therapy. b) Ājāsrik rasāyana which is nothing but a rasāyana like dietetics. This too is a non-medicinal procedure and it is administered in the form of rejuvenating food and dietetics. c) Auṣadhi rasāyana where a range of herbomineral rasāyana drugs are used to achieve the rasāyana effect in the body. These are medicinal rasāyanas which produce rasāyana effect through their actions at one or all of the three levels mentioned above such as at the level of rasa, agni and srotas i.e. as micronutrients, metabolic boosters or as promoters of microcirculation.

4. Ancient texts specially Suśruta Samhitā describes a group of special rasāyanas called divya rasāyana with a claim that if appropriately consumed the divya rasāyanas transform the body mind system with outstanding achievements of divine nature. Suśruta Cikitsā sthāna chapter 30 describes 18 rare great herbs namely ajagāri, svetkapoti, kriṣṇakapoti, gonaśi, vārāhi, kanyā, catrā, aticchatrā, karenu, aja, cakrākā, ādityaparṇi, brahmasuvarecalā, sravaṇi, mahāsravaṇi, golomī, ajalomī and mahāvegavati. These are 18 great herbs like soma. The procedures, benediction and prayer in their respect are like Soma as prescribed in the scripture. Probably it was the Soma herbs of Ayurveda which were used to prepare the somarasa that the gods used in ancient times for their health and longevity. Unfortunately these unique herbs which were prescribed for gods are now not available and their identity is lost. There is a need of research on these great remedies.

12. ACCUMULATING NEW EVIDENCE

Any review of the new evidence-base is beyond the scope of this article. However the author is inclined to add a passing reference to the trend of raising new evidence to validate the ancient wisdom. There has not been any attempt to investigate the science behind the Ayurvedic concepts and theories but there has been lot of interest among the biomedical scientists to evaluate the therapeutic value of a range of rasāyana remedies of Ayurveda specially for their immuno-enhancing, neuro-nutrient, anti-aging and anti-stress effect showing encouraging results. Among the glimpses of such studies the pertinent ones seem to be the following. Kobayama et al. (2005) reported their invitro studies in British Journal of Pharmacology demonstrating the efficacy of Withanolide-A isolated from rasāyana drug aśvagandhā (Withenia somnifera dunal.) as a neuro-regenerative agent. Neurons cultured with Withanolide-A showed that the dendrites of the neurons became elongated and the synapses got reconstructed. Aśvagandhā was also shown to reduce the biological aging scores in elderly volunteers kept on aśvagandhā rasāyana for six months as reported by Dwivedi and Singh (1997). Similarly laboratory studies reported in Journal of Ethnopharmacology by Archana and Namasiyayam (1999) showed significant anti-stress effect. Singh et al. (2008) reported in Biogerontology their studies on the neuro-nutrient effect of Ayurvedic rasāyanas in brain aging. So
also Jayaprakash et al. (2013) reported neuro-protective role of \textit{s\textsuperscript{v}agandh\text{\text{"a}}} in mouse model of Parkinsonism. This drug is already reported to possess immuno modulating effect. It is suggested that neuro-nutrient effect, neuro-protective impact, anti-stress effect, anti-aging effect and immunemodulator effects are interlinked and are likely to be a continuum. Some ras\textit{\text{\text{"a}}}yana drugs specially \textit{\text{"a}}malak\text{\text{"i}} ras\textit{\text{\text{"a}}}yana have been reported by investigators like Lakhotia and associates to produce significant beneficial effect on life process including DNA repair in experimental models.

\textit{Ras\textit{\text{\text{"a}}}yanas} like \textit{\text{"a}}malak\text{\text{"i}} have been suggested to be used to maximize the anticancer immunity in cancer patients undergoing artificial immunotherapy using a range of anticancer vaccines. Although till date no data is available to evaluate any success potential. These \textit{ras\textit{\text{\text{"a}}}yanas} have also been used with benefit to protect the patients undergoing chemo therapy and radiation therapy from harmful effects of these therapies. \textit{Ras\textit{\text{\text{"a}}}yana} drugs like \textit{\text{"a}}malak\text{\text{"i}} and \textit{haridr\text{\text{"a}}} were recently used in treatment of mild to moderate \textit{diabetes mellitus} with evidence of immunocompromised state and three months treatment showed noticeable improvement in the rate of glycemic control of these patients along with improved \textit{ojas} status measured by a rating scale for negative \textit{ojas} scores. A preliminary clinical study conducted by Singh and associates in cases of Bronchial Asthma with \textit{vaman} therapy i.e. therapeutic emesis, indicated significant evidence of Histamine dialysis and suggested Mast cell stabilizing effect associated with significant symptomatic relief and prolonged remission of the disease. It cannot be overemphasized that the public demand for new scientific evidence for safety and accuracy of traditional medicine are increasing and such a challenge needs to be adequately addressed (Rastogi \textit{et al.} 2012).

\textbf{13. Conclusion}

Thus the ancient Ayurvedic texts have described the basics of a unique holistic immunology interlinked with tissue nourishment, \textit{ojas} formation as the biological determinant of vital bio-strength and immune strength in an individual. Ayurvedic immunology is not merely limited to antigen antibody phenomenon in infective diseases and immune-degeneration rather it is involved in maintenance of positive health in general including homeostasis, resistance against disease, longevity and stress tolerance with an inherent bond with the nutritional status of an individual. The texts present a very comprehensive account of the Ayurvedic science of nutrition, longevity, immunity against disease and stress coping ability, all in one sweep in its \textit{Ras\textit{\text{\text{"a}}}yana Tantra} which is one of the eight major specialties of \textit{A\text{"s}t\text{"a}nga Ayurveda}. Thus Ayurvedic immunology has strong potential to enrich the contemporary immunology with its pro-nature individualized holistic approach which is very much missing in modern immunology with dominant pathological face and limitations of its reductionist approach.

\textbf{Selected Textual References}

1. शुचक \text{\text{"a}}}णित संस्थों यो भवेदीश उत्कट: प्रकृ\text{\text{"a}}}तिजायते तेन। – \text{\text{"a}}}ु. 4:63
   The \textit{Do\text{"a}} (vata, pitta or kapha) which is expressed with dominance during fertilization ie contact of sperm and ovum in a couple manifests the \textit{Prak\text{\text{"a}}}ti or Genetic Constitution of the particular offspring. – \text{\text{"a}}}S\text{\text{"a}}.4.63

2. दोषनुसारित्या हि ए\text{"a} देह प्रकृ\text{"a}ति उष्णते। – \text{\text{"a}}}ु. 7:40
   The \textit{Do\text{"a}} specific constitution is called \textit{Deha Prak\text{"a}ti}.-CS\text{\text{"a}}.7.40

3. प्रकृ\text{\text{"a}}}तिनाम जननरणनातराय भविषी गर्भविवर्तति काले स्वकराणादेक जनिता निर्विविकार कारणीमिथिति। – \text{\text{"a}}}सवेशीकर्तव / नरसिंह भाष
   The \textit{Prak\text{"a}ti} is the product of the dominant manifestation of the respective humors during embryogenesis occurring in the period falling between birth and death.- \text{\text{"a}}}V/Narasimha bh\text{"a}\text{\text{"a}}ya.

4. कायांना प्रकृ\text{\text{"a}}}तिः \text{\text{"a}}}तरथ वरुणां क्रियां चरेत। – \text{\text{"a}}}ु. 4:96
A practicing physician should plan the line of disease management after duly determining the Prakriti/constitution of the individual. SS. Śū.4.96.

The Mental Constitution is created by the relative preponderance of the three gunas viz. sattva, raja and tama and is called Mahaprakṛti. SS. Śū.4.95.

The pre-birth constitution of an individual is relative to the embryonic conditions. - CS.Vi.8.97.

The Prakṛti is also re-shaped by epigenetic factors like caste, family, climate, chronology, age etc. CS. In 1:6

Gestational errors may lead to birth of a child with a variety of genetic defects such as autism, deformed body, lame, dwarfism, visual errors and blindness etc. - SS. Śū.3.18

There are three kinds of immune disorders, viz.1. Oja-vyapat or aberrant/labile immune disorder, 2. Oja-visransa or dislodged immunity such as autoimmune disorder, and 3. Oja-ḥaya (Immune deficiency). - SS.Śū.15.24

Ojakṣaya refers to immune deficiency. - SS. Śū. 15
17. अभियाताक्ष्याकोर्णकोकाङ्क्षानुचरभावः।
Trauma, emaciation, anger, sorrow and excessive physical exertion result into ojakṣaya, i.e. immune compromised state.

18. आयुं: संक्रायते हयोभ्यो धातुग्रहणानि:सृपम्। – सु सू 15: 24
The above factors deplete immune strength. – SS. Su. 15.24

19. व्यायामित्र व्यायामाविरोधिर्या अस्तुपरापदिबनामितमिती
Immune strength prevents a disease on one hand and also reduces the severity of an existing disease on the other hand. – CS. Su. 28.16/Chakra Commentary.

20. न च सर्वाणि शरीराणि व्याक्षिमाले समस्तानि भवति। च. सू 28:16
All individuals are not equally and always empowered with immunity. – CS. Su. 28.16

21. विशेषात् कुष्ठ: पुनःपुनःित्तानाधिकवित्रकिमावन्यात्।
The parasites are treated by physical removal, by elimination of the causes and by therapeutic rendering of the pathogens from pathogenic to nonpathogenic nature. – CS. Vi. 7.14

22. तत्र सर्वक्रीणांवर्षणशास्त्रविदः।
The parasites are treated by physical removal, by elimination of the causes and by therapeutic rendering of the pathogens from pathogenic to nonpathogenic nature. – CS. Vi. 7.14

23. प्रसंगातः ग्रात्र संस्कृतविशाचारवातः सहभोजनाति।
Dermatoses, fevers, tuberculosis and conjunctivitis spread from person to person by physical contact through sexual contact, touching the body, inhalation, eating together, sleeping with same bed, sitting together by apply/using contaminated flowers, garlands, sharing perfumes etc. – SS. Ni. 5.32-33

24. भेषज्ज्ञात्रिकिं च तत्।
Medicines are of two kinds: (1) Those which enrich vigor and vitality in the healthy, and (2) Those which remove the diseases from the diseased persons. – CS. Ci. 1.1.4

25. वस्त्रस्योपज्जस्यां ग्रहः (तदसू)।
The remedies which impart health and vigor are categorized as Brisya (viriliser) and Rasāyana (rejuvenatives). – CS. Ci. 1/1.5

26. रसायनतन्त्र नाम व्रज:स्थापनामपुष्काशवल्कर्षेगापहरण सम्बं
The science of rasāyana (medicinal rejuvenation) imparts longevity, cognitive ability, biological strength and removes diseases. – SS. Su. 1.7

27. दीपांशु वृक्षमात्राय तरुण वयः।
The remedies which alleviate senescence and disease are called rasāyana. – Sh. S. Purva 4.13

28. लोकस्थितिः सृष्टिमात्रायणम तरुण वयः।
The rasāyana remedies promote longevity, memory, cognitive ability, health, youth, lustier, complexion, healthy voice, gesture, sensorial and somatic strength, perfection, in speech, virility, shining face. The rasāyana is the means of procuring the superior tissues. – As. Hr. Utta. 39.1,2

29. अमरात्मा विज्ञानाय कल्याणमृत्तिः रसायनतः।
BIBLIOGRAPHY

Archana, R. and Namshivayam, A. Antistress effect of Withania somnifera Dunal, J. Ethnopharmacology. 64:91-93, 1999

Caraka 700 BC CS. Ci. Ch. 1, pada 1-4. Edited by Sharma, PV, Choukhamba Orientalia, Varanasi, India 2002

Caraka 700BC, CS. Sū. Ch. 1 Edited by Sharma PV, Choukhamba Orientalia, Varanasi, India 2002


Ghodke, Y., Joshi, K and Patwardhan, B. Traditional medicine to modern pharmacogenomics Ayurveda Prakriti types and CYP2C19 Gene polymorphism associated with the metabolic variability. Evidence based Complementary Alternative Medicine, P 249528, 2011


