CONCEPT OF IMMUNOMODULATION IN AYURVEDA AND SOME IMMUNOMODULATORY HERBS

Bhanu Pratap Singh¹, Deepa²

¹MD Scholar, Dept. of Sharir Kriya, ²MD Scholar, Dept. of Sharir Rachana, NIA, Jaipur, Rajasthan, India

ABSTRACT

An immunomodulator is a drug used for its effect on the immune system. It can be defined as a substance, which can influence any component or function of the immune system in a specific or nonspecific method. The concept of immunomodulation is mentioned as Rasayana in Ayurveda. Ayurveda has two aims - first one is prevention and promotion of health and the other one is cure from disease. Rasayana are used for both aims. It is one of the eight major divisions of Ashtang Ayurveda. Rasayana remedies act basically on nutrition dynamics and rejuvenate the body and psyche. They are used for promotion of health, longevity and prevention of diseases. They preserve the Ojas status and improve the Vyadhikshamatva i.e. immunity. Rasayana builds natural resistance against infection. The use of herbs for improving the overall resistance of body against common infections and pathogens has been a guiding principle of Ayurveda.

Keywords: Immunomodulator, Rasayana, Vyadhikshamatva.

INTRODUCTION

The active agents of immunotherapy are collectively called immunomodulators. They are a diverse array of recombinant, synthetic and natural preparations, often cytokines. Some of these substances such as granulocyte colony stimulating factor (G-CSF), interferon, imiquinol and cellular membrane fractions from bacteria are already licensed for use in patients. Others including IL-2, IL-7 and IL-12, various chemokines, synthetic cytosine phosphate guanosine, oligodeoxynucleotides and glucane are currently being investigated extensively in clinical and preclinical studies. Immunomodulatory regimens offer an attractive approach as they often have fewer side effects than existing drugs, including less potential for creating resistance in microbial diseases.¹ Ayurveda has mentioned the concept of immunity as “Vyadhikshamatva”. Acharya Chakrapani has interpreted the term Vyadhikshamatva as “Vyadhi bala virodhitva” means opposed to the strength and virulence of the disease and “Vyadyutpad prati bhaktwa” means ability to restrain and bind the causes and factors of the diseases. Charaka has described Bala as a factor that destroys Dosha and disease causing factors. Vyadhikshamatva or Bala is not of the same, it varies with individuals. It also depends upon nutritional, environmental and individual factors both physical and mental. In our classics Bala is stated to be of three types² -

1 Sahaja bala- It is innate and natural resistance to disease which exists since birth.
2Kalaja bala- It is influenced by seasonal traits and age of the person.

3Yuktikrit bala- This refers to modulation of body’s resistance against disease by use of proper diet, physical exercise, rest and Rasayanas.

Acaharya Sushruta has mentioned that Ojas and Bala is same thing. There are two types of Ojas are mentioned in Samhit- tas- Apara ojas (ardhanjali pramana) and Para ojas (ashta bindu pramana). Ojas has direct influence on body’s defence.

In fact one of the therapeutic strategies in Ayurvedic medicines is to advance the body’s overall natural resistance to the disease causing agent rather than directly neutralizing the agent itself. The use of herbs for improving the overall resistance of body against common infections and pathogens has been a guiding principle of Ayurveda. Such herbs possessing immunomodulatory effects are referred to as Rasayanas in Ayurvedic classics. They are believed to have the capacity of protecting the body against external factors that induce disease. The implicit resistance against disease may correspond to the modern concept of immunity.

Ayurveda has two aims- prevention and promotion of health and the other one is cure from disease. Rasayana may be used for satisfying both aims. Rasayana Chikitsa is the branch of Ayurvedic science, which deals with different aspects of preventive health care. It is one of the eight major divisions of Ashtang Ayurveda. Sushruta has defined a healthy man as one whom has:

• Equilibrium of the Doshas (Sama dosha).
• Normal functioning of Agni (Sama Agni)
• Normal condition of 7 Dhatus (Sama Dhatu)
• Normal Excretion of waste products (Sama Malakriya).

Beside this Atma (Soul), the Indriyas (sense organs) and Mana or mind should be happy and joyful. The modern definition of health by W.H.O. is also same that “Health is a state of complete physical, mental and social well being and not merely absence of disease”. This healthy condition of mind and body can be achieved by Rasayana therapy or Rejuvenation therapy. Rasayana drugs are supposed to slow down the aging process (jara) and offer a defence against disease. Rasayana improve the host resistance of an individual, helping to prevent aging and diseases. Specific diets and lifestyle changes are also advised in Rasayana therapy.

Etymology
Rasayana is made up of Rasa and Ayana. Rasa principally means essential seven vital tissues: Rasa (lymphatic), Rakta (blood), Mamsa (muscle), Meda (adipose tissue), Asthi (bones), Majja (bone marrow) and Shukra (reproductive element). Ayana means the path or channels for the same. So Rasayanas are those that carry about appropriate uptake, growth and improvement of seven essential vital tissues. Rasayanas provide long life, good intellect, ability to remain young and general well being.

Rasayana Chikitsa in Samhita
Charaka Samhita:- In Charaka Samhita 1st chapter of Chikitsa sthana is committed to Rasayana therapy. Charaka has mentioned Rasayana as the means of obtaining the best qualities of Rasadi dhatus. Best quality of Rasa leads to the creation of best qualities of other Dhatus. So it the procedure by which all body tissues are nourished. Here various Rasayana Yogas are described as-
6 yogas in Ch.Chi 1-1
37 yogas in Ch.Chi 1-2,
16 yogas in Ch.Chi 1-3,
4 yogas in Ch.Chi.1-4.
Sushrnota Samhita:- Sushruta has described four chapters (from 27th to 30th) in Chikitsa sthana for Rasayana. Acharya has mentioned that Rasayana should be used in young or middle age invariably after prior unction and evacuation. He also mentioned seven types of persons whom should not use Rasayana.

Vagbhatta Samhita:- Acharya Vagbhatha has described Rasayana therapy in last chapters of Uttara tantra (49th chapter of Ashtang Samgraha and 39th of Ashtang hrudaya). The description of Rasayana resembles close to Charaka Samhita.

Various details of Rasayana therapy is available in Sharangadhar Samhita Purva khand 4th chapter, Kalpa sthana of Kasyapa samhita, in Chikitsa kalika written by Testaacharya etc.

Classification of Rasayana
Rasayana is chiefly divided into two types:-
• Dravyabhuta Rasayana
• Adravyabhutas Rasayana (Achara Rasayana)

(A) As per method of use (According to Acharya Charaka):
• Kuti Praveshika (in door use) - This type of Rasayana is administered in Trigarbha kuti.
• Vatatapika (outdoor use) - There is no need to live in any kuti.

(B) As per Scope of use:
• Kamya Rasayana- Kamya means desire. The Rasayana used for attainment a specific wish is called Kamya Rasayana.
  (a) Prana kamya: Aiming to complete desires of vitality and longevity.
  (b) Medhakamya: Promoter of intellectual power e.g. Brahmi, Shankhpushpi.
  (c) Shreekamya: To enhance the complexion and lusture.

• Naimittika Rasayana- Naimittika Rasayana is to be used in person suffering from definite disease like Shilajit in prameha.
• Ajasrika Rasayana- It can be used daily as diet like Dugdha, Ghrita.

(C) According to Prabhava (Effect):
• Samshodhana Rasayana- The Rasayana which eradicate the vitiated Doshas by expelling from body known as Samshodhana Rasayana.
• Samshamana Rasayana- The Rasayana drugs which have shaman effects on Doshas are called Samshamana rasayana.

(D) As per content of Rasayana:
• Ahara rasayana- It is based on diet.
• Aushadha rasayana- It is based on herbs and drugs.
• Achara rasayana- It is based on conduct and behaviour.

(E) According to Sapta Dhatus (Body tissues):
• Rasa (Lymphatic)
• Rakta (Blood)
• Mamsa (Muscles)
• Meda (Adipose tissue)
• Asthi (Bone)
• Majja (Bone marrow)
• Shukra (Reproductive element)

(F) According to Satmya:
✓ Desha Satmya- There is three types of Desha are mentioned in our classics:-
  1. Anupa Desha
  2. Jangala Desha
  3. Sadharana Desha
✓ Ritu Satmya-
  • Aadana kala- Shishir, basant and grishma ritu.
  • Visarga Kala- Varsha, sharad and hemant ritu.

(G) According to Modern Medical Science:
• To enhance Immunity.
To improve and recover metabolism.
To improve secretions (Both exocrine and endocrine).

**Mode of action of Rasayana**

*Rasayana* fundamentally promotes the health through three modes. They are:

- By directly enriching the nutritional ingestion of the body through increasing the consumption of milk, ghee etc.
- By improving *Agni* i.e. digestion and metabolism through *Bhallataka*, *pip-pali* etc.
- By promoting the potential of *Srotas* or microcirculatory channels in the body, through herbs like *Guggulu*, *tulsi* etc.

**Some immunomodulatory herbs**

Here is description of some herbs, which are used as *Rasayanas* (immunomodulator) in our classics-

1. **Tinospora cordifolia** (*Guduchi*): It is used in management of jaundice, diabetes, skin diseases, anaemia, emaciation and infections. Plant extracts are recognized to motivate macrophages and enhance their phagocytic activity and intracellular killing activity. It was reported to develop surgical outcome by strengthening host defences. *Tinospora cordifolia* has been evaluated as an adjuvant in clinical conditions like obstructive jaundice, TB and cancer chemotherapy and has been found to enhance the efficiency of conventional therapies. It is also revealed to utterly motivate macrophages and improve their phagocytic activity.

2. **Emblica officinalis** (*Amalaki*): It is a rich source of vitamin C. The fruits of *E. officinalis* have been used in *Ayurveda* as effective *Rasayana* and also for the management of miscellaneous aetiology diseases. Perhaps there is no other drug in any other system of natural medicine with such an immense range of endorsed effects. In an experimental study, it was reported that *E. officinalis* could bring about a noteworthy weight gain in the subjects together with an increase in serum total protein content. It is used as antioxidants, antibacterial, anti-inflammatory agent. The anti oxidant activity of *E. officinalis* resides in tannoids.

3. **Terminalia chebula** (*Haritaki*): It is an antibacterial, antioxidising, anti-inflammatory and immunomodulatory agent. The topical administration of an alcoholic extract of the leaves of *T. chebula* was found to heal much faster as indicated by decreasing period of epithelization. The tensile strength of the tissue was increased by 40%. Biochemical studies have shown a noteworthy increase in total protein, DNA and collagen contents in the granulation tissue of treated wound. Reduced lipid peroxide levels in treated wounds recommend anti oxidant activity. The extracts of *T. chebula* were found to appreciably restrain yields of cytomegalo virus in lungs of mice. Thus *T. chebula* may be valuable for prophylaxis of CMV in immunocompromised patients.

4. **Glycyrrhiza glabra** (*Yashtimadhu*): It is an immunomodulator and antioxidant. Glycyrrhizin, a triterpenoid glycoside obtained from it is found to slow up RNA viruses such as measles, polio viruses’ type1, 2 and 3 and DNA viruses such as herpes virus 1 and 2. Polysaccharide fractions obtained from the root of *G. glabra* persuade nitric oxide production from macrophages.

5. **Commiphora mukul** (*Guggul*): It is used as an anti inflammatory, anti-hyperlipidemic and immunomodulatory agent. A randomised control trial of *C. mukul*, at 50 mg twice daily was conducted on patients with hypercholesterolemia. *C. mukul*, decreased total cholesterol by 11.7%, low density lipoprotein
(LDL) by 12.5%, triglyceride by 12% and the ratio of total cholesterol/high density lipoprotein (HDL) by 11.1%.\(^\text{18}\)

6 *Allium sativum* (Lahsuna): It is an antimicrobial, antitumor, hypolipemic, antiarthritic and hypoglycaemic agent. These descriptions have been correlated to their influences on immune functions in different ways\(^\text{19}\). The herb has been found to enhance human immune functions by stimulating peripheral blood mononuclear cells. Diallyl sulphide in *A. sativum*, is known to exert anti carcinogenic activity\(^\text{20}\). Allicin has been found to encourage programmed cell death and seize of proliferation in cancer cell.

7 *Withania somnifera* (Ashwagandha): It is one of the much-admired Rasayana. It is an immunomodulatory, anti-inflammatory and antioxidising agent. *W. Somnifera* efficiently inhibits the inflammatory process. It can also bring about a specific decline in alpha-2 macroglobulin synthesis, unlike the conventionally used non-steroidal anti-inflammatory drugs (NSAIDS) and has anti-oxidant activity\(^\text{21}\). The herb is described to act as Rasayana and Medhya. In a clinical study on patients of anxiety neurosis, it was observed to diminish the symptoms of anxiety. In another study, the herb has been shown to be successful in cases of depression. This plant also produced leucocytosis with predominant neutrophilia and prohibited leucopenia induced by cyclophosphamide\(^\text{22}\).

8 *Azardicta indica* (Neem): It is reported to have numerous therapeutic effects, including being anti infective, anxiolytic and having general immunopotentiating capacity\(^\text{23}\). It is extensively studied for a range of valuable properties. The aqueous extract of *Neem* leaves improve the phago-cytic activity of macrophages. In human volunteers, it stimulates humoral immunity by increasing antibody levels and cell mediated immunity by increasing total lymphocyte and T-cell count.

9 *Asparagus racemosus* (Shatavari): It is used as an immunomodulator and antioxidant. The aqueous extract of the whole plant of *A. Racemosus* gives defence from biological, physical and chemical stresses\(^\text{24}\). Aqueous extract of *A. Racemosus* are also found to suppress the myelo-suppressive effects of single and double doses of cyclophosphamide\(^\text{25}\).

10 *Samecarpus anacardium* (Bhallatak): Extract of nut preparation of *S. Anacardium* is effective against a variety of diseases like arthritis, tumours and infections. An extract of *S. Anacardium* at a dose of 150 mg/kg considerably reduced the lysosomal enzyme activity in arthritic animals\(^\text{26}\).

11 *Piper longum* (Pippali): *Pippali rasayana*, an Ayurvedic herbal medicine prepared from *P. Longum* is prescribed for the treatment of chronic dysentery and worm infestation. *P. Longum* significantly increases macrophage migration inhibition and phagocytic activity\(^\text{27}\).

12 *Aloe vera* (Ghritkumari): *Aloe vera* is a plant exclusively used in skin care protection and other health care products. It is also found to possess’s anticancer activity. Supplementation of *Aloe vera* gel has been found to suppress the occurrence of hapatocarcinogenesis in male rats\(^\text{28}\).

13 *Boerhaevia diffusa* (Punarnava): The plant *Boerbeavia diffusa* is used as an antiarthritic, immunomodulatory and anti-stress agent. It is known to potentiate macrophage phagocytic activity.

14 *Ocimum sanctum* (Tulasi): It is used as an antistress, antioxidant and immunomodulatory agent. The ethanolic extract of *O. Sanctum* inverted the changes in plasma levels of corticosterone induced by exposure to acute and chronic stress\(^\text{29}\).
15 Shilajit (Asphalt): It is an exudate of selected rocks in Himalaya region. It is a composite mixture of both organic and inorganic matter and is measured to be effective therapy for many diseases. A study showed that Shilajit exhibited cytotoxic effects and inhibited the carcinogenic potential of cyclophosphamide. In experimental studies, it also has been observed that Shilajit activates macrophages and enhance cytokine release.

16 Chyawanprash Awaleha - Rasayana formulation: It is a polyherbal Ayurvedic rasayana preparation described in Charak Samhita. This preparation is used as a health supplement. It contains the pulp of Embelia officinalis as the chief component. In a controlled clinical study using Chyawanprash awaleha as an adjuvant in treatment of pulmonary tuberculosis, it was observed that the preparation could enhance the recovery process in addition to an improved nutritional status of subjects.

**DISCUSSION AND CONCLUSION**

The immune system is an intricate system, linking network of biochemical mechanism. The concept of Rasayana as described in Ayurveda is a holistic approach. It constitutes an important approach to handle with subjects of immunity. Rasayana is a specific type of treatment influencing the basic aspect of body i.e. Dhatu, agni and srotas. Herbs used as Rasayana and other Rasayana formulas provide amazing potential to be fascinated for immunomodulatory activity.

- Probably Rasayana drugs are having Madhura, guru, snigdha, and sheeta properties act at level of Rasa by promoting the nutritional significance of the Rasa which helps in obtaining the best virtues of Dhatus.
- The Rasayana having the Ushna, laghu, ruksha and katu, tikta, kashaya rasa may be acting at level of Agni, stimulating the organic metabolism.

- The Rasayana drugs with Katu, tikta, kashaya rasa, vishada, ruksha, laghu guna, ushna veerya and Katu vipaka may cause Srotoshodhana and may help in the assessment of the Rasayana effect in the body.

Besides immunomodulatory action Rasayana drugs acts as antioxidant, antistress, anti-inflammatory, anti-microbial, anti-aging, anti-arthritic and anti-bacterial agents.

**REFERENCES**

8. Kaviraja Ambikadutt Shashtri edited Sushruta Samhita part-1 Chikitsasthana


13. Ahmad, Mehmood and Mohammad, Screening of some Indian medicinal plants for their antimicrobial properties, 1998, p-183.


16. Badam, Invitro studies on the effect of glycyrrhizin from Indian Glycyrrhiza glabra Linn.on some RNA and DNA viruses, Indian J. Pharmacology, 1994, p-211.


29. Sembulingam, Effect of Ocimum sanctum on noise induced changes in plasma corticosterone level, 1997, p-139.

30. Katiyar, C.K., Immunomodulator products from Ayurveda: Current
status and future perspectives, Narosa publishing house Delhi, 1995.

CORRESPONDING AUTHOR

Dr. Bhanu Pratap Singh
Dept. of Sharir Kriya
National Institute of Ayurveda
Jaipur, Rajasthan, India
Email: bhanushekhawat17@gmail.com

Source of support: Nil
Conflict of interest: None Declared