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# Concept of *Ojas* : A Scientific Analysis

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## ABSTRACT

**Background:** The resistance power and immunity together are manifested by the *Ojas* component which is present throughout the body i.e., *Sarbasharirvyapi*. *Oja* is the essence of all the *Dhatus* and is responsible to protect the body. In different classical Ayurvedic texts *Oja* has been described elaborately with its type, site, quantity, function, and derangement etiology. Various researchers based on their ideas have given its modern parlance with immunity and stem cells etc. **Aims and Objects:** Despite being invisible, *Oja* is playing a very important role in the living body by its functions. The present review explains some important information about the fundamental concept of *Oja* & interprets it with amino acids along with their function. **Materials & Methods:** Original textbook of *Charaka Samhita* along with commentary, *Susruta Samhita* along with *Nibandha Samgraha* commentary, *Astanga Hridayam* along with *Sarbanga Sundari* and *Ayurveda Rasayana* Commentary, other available published articles in peer-reviewed journals, published books and subjects related material available online have been thoroughly screened, compiled, organized and described in a systemic manner. **Observation:** Amino acids are important constituents of food. They supply the required building block for protein synthesis. It is also called basic building units. All twenty amino acids did not appear simultaneously in nature. Instead, some of them appeared rarely, while others were added to the genetic code later. It is necessary to take them in the diet because their deficiency results in decreasing the formation of a protein that ultimately leads to the disease condition. *Oja*, *Saptadhatusara* also formed from the *Prasadbhaga* of food. It is also considered a vital defense mechanism of the body. *Dusti* of *Oja* is responsible for various diseases such as *Madhumeha*, *Yakshma*, *Jwar*, *Pandu*, etc. **Conclusion:** The qualitative *Ojas* initiate the contentment, nourishment of the body and increase strength in terms of physical, mental, immunological of the body. Various authors have mentioned the concept of *Ojas* in their way but it is a bit difficult to define *Ojas* as per modern. Therefore, this review article attempts to create a novel concept of *Ojas* & their relation with amino acids, which is understandable in a scientific way and its overall effects on the human body which will be helpful for scholars in the treatment of diseases and advising precautions.

**Key words:** *Ojas*, *Para* and *Apara Oja*, *Vyadhikshamatva*, *Amino Acids*.

## INTRODUCTION

The healthy state of the body rests on the state of dynamic equilibrium of *Dosha*, *Dhatu* & *Mala* components. The human body is in continuous exposure

to external and internal stresses which make the body vulnerable to diseases. But the tendency to have the disease is prevented by many factors within the body. Qualitative *Ojas* initiate the contentment nourishment of the body and increase in strength in terms of *Vyadhikshamatwa*.<sup>[1]</sup> According to *Charaka Samhita*, (during embryogenesis) the *Oja* appears foremost in the human body.<sup>[2]</sup> The resistance power, immunity is together manifested by this *Oja* component presented throughout the body. *Oja* is stated as cause and its effects being the resistance power viz. *Bala* is responsible for survival and performing important functions inside the body.<sup>[3]</sup> The *Ojas* being practically invisible is very well known for its functions manifested in the living body.<sup>[4]</sup>

In a word, *Ojas* has been considered vital in the defense mechanism of the body.<sup>[5]</sup> In all diseases, *Ojas* get

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affected by the production of the disease of the respective system. Modern-day researches have implicated the malfunctioning of the immune system in various diseases including not just those caused by microbes but also non-microbial diseases like cancer, allergies, and autoimmune disorders, etc. Acharyas have detailed about its types, characteristics, functions, and etiology behind its dysfunctions that leads to total disruption of the normal homeostasis of the body which is sometimes fatal.<sup>[6]</sup> This concept persuades us to think in deep about the role of *Ojas* at the cellular level.

Amino acids act as building blocks to form protein. But only 20 amino acids among the available more than 300 amino acids take part in protein synthesis.<sup>[7]</sup> All twenty amino acids did not appear simultaneously in nature. Instead, some of them appeared early, while others were added to the genetic code later. It is necessary to take them in the diet because their deficiency results in decreased formation of protein and ultimately leads to other health hazards. Mainly deficiency of dietary protein or amino acids can result in decreased immunity, digestive problem, depression, fertility issues, lower mental alertness, slowed growth in children, etc. So, amino acid plays an important role in our body.<sup>[8]</sup> In the recent past, various researchers based on their ideas, have given their modern parlance with immunity,<sup>[9]</sup> stem cell, endoplasmic reticulum,<sup>[10]</sup> etc.

The views differ in explanation of *Ojas* namely it is quoted to be a factor related to immunity in the physiology text book by Dr. Ranjit Rai Desai;<sup>[11]</sup> whereas referred to as a part of vitamins, albumin, glycogen, internal secretion of testicles, ovary, prostatic secretion by Dr. Ghanekar.<sup>[12]</sup> It is also related to amino acids by Dr. Abichal Chattopadhyaya.<sup>[13]</sup>

A thorough deciphering of every aspect of *Ojas*, as reported in the classical texts, is necessary. Even though this *Ojas* is the essence of all the *Dhatus* inside the body, its production, maintenance, storage, utilization and proper circulation inside the body must be consistent and proportionate. Some extended information about the basics of *Oja* will browse in this

present review & decipher the fundamental concept of *Oja*.

## MATERIALS AND METHODS

After studying the original textbook of *Charaka Samhita*, *Susruta Samhita*, *Astanga Hridayam*, along with their respective commentaries such as *Ayurveda Dipika*, *Nibandha Samgraha & Sarbanga Sundari*, and *Ayurveda Rasayana* & others available published articles in peer-reviewed journals, other related books available online have been thoroughly screened, compiled, organized and described systemically.

## OBSERVATIONS

The *Ojas* manifest within the embryo right at the time of fertilization when *Shukra* (sperm) fuses with *Shonita* (ovum) *Paka* of *Shukradhatu* (both *Shukra* and *Shonita*) takes place (fertilization) and two components are formed i.e., *Sara* (nutrient materials) and *Mala* (excretory products).<sup>[14]</sup> This *Ojas* performs its function of *Avastambha* and supports the fetal life in *Garbha*. *Oja* is of two types - *Para* and *Apara Ojas*.<sup>[15]</sup> Thus, the *Ojas* can be regarded as the product of conception having derived from sperm and ovum; carry the *Sara* of all *Dhatus* in them, which make them viable. In the later period of intrauterine life, when the heart is developed, it enters into the heart and with the vessels connected to it, circulates throughout the body of the fetus.<sup>[16]</sup> Every tissue of the fetal body is supplied with *Ojas* and supported by it. Hence, *Ojas* are said to be prevailing in all the stages of intrauterine life. The resistance power viz. *Bala* and immunity are together manifested by this *Ojas* component which is responsible for survival and performing important functions inside the body. In one word, *Ojas* have been considered a vital force in the defense mechanism of the body. The concept of *Ojas* and its functions are described as follows;

**Table 1: Quality of Ojas**

Guna <sup>[17]</sup>	Substance	Abundance
<i>Snigdha</i> (unctuousness)	Immunoglobulin, Plasma protein, Mast cells, B-lymphocyte, T-	Plasma whole body, tears, saliva, intestinal secretion.

	Lymphocyte, Lysozyme	Semen etc. Skin, lungs, digestive tract, mouth, conjunctiva, and nose. Reticulo-endothelial cells, lymph nodes, and glands, GIT, respiratory, genitourinary system, tears, brain.
<i>Madhur</i> (sweet)	Glucose, glycogen & lipid	Whole-body
<i>Sthira</i>	Integral protein, fat, and carbohydrate in a cell.	Whole-body
<i>Mridu</i> (soft); <i>Mritsna</i> (slimy)	Plasma protein and lipid	Plasma
<i>Guru</i> (heavy)	Plasma protein	Plasma
<i>Sheeta</i> (cold)	Liquid of plasma	Plasma
<i>Shukla</i> (Clear white)	Plasma, WBCs, and cytoplasmic granules	Whole-body
<i>Sara</i> (Capacity of flowing and permeating through)	All liquid parts of the body, neutrophils, lymphocyte, monocyte, and macrophages, aneroid movement	Whole-body, in tissues
<i>Viviktam</i> (foremost in action, nutrition in best quality)	Nutrients of plasma	Whole-body

Table 2: Physiological Function of Ojas.

SN	Ojas Karma <sup>[18]</sup>	
1.	<i>Swarvarnaprasad</i>	Clarity of voice & brightness of complexion, Clearness, purity

2.	<i>Sthiri Upachitamamsata</i>	Strength bestows stability and growth of muscles or all <i>Dhatusara/Upachaya</i> -prosperity
3.	<i>Sarvachestashu-Apratighata</i>	Ability to perform all activities without any hindrance, Uninterrupted, unobstructed, irreversible physical action
4.	<i>Bahyanamabhyantaranam Cha Atma Karyapratipattir Bhavati</i>	The function of external sense organs means <i>Karmendriyas</i> or motor organs (hand, feet, larynx, penis, and anus) and internal sense organ means <i>Jnanendriyas</i> or sensory organs (eye, ears, tongue, nose & skin) and also mind.

Table 3: Pathological condition of Ojas.

Oja Vikriti <sup>[19]</sup>	Features		
<i>Visramsashtanat-Chyuti</i>	<i>Sandhivishlesha</i>	<i>Sandhi-Vislesah-Sandhinamvishatanam</i>	Looseness of the joints
	<i>Gatranamsadanam</i>	<i>Deha-Angaabasad</i>	Prostration of extremities.
	<i>Dosachyavanam</i>	<i>Dosa-Chyavanam Swasthanat-Vatadinam-Bhramsah.</i>	Displacement of <i>Dosas</i> from their respective location.
<i>Kriya-Sannirodhascha</i>	<i>Kriyanam Kaya-Bak-Manosadinam-Sannirodhah;-Cha-Karat-Valasya-Prakrit-Karma-Hanih.</i>		Impairments of the function of the <i>Kaya</i> , <i>Vaaka</i> , and <i>Mana</i> .
<i>Vyapanne</i>	<i>Stabdthagurugatrata</i>	<i>Stabdha-Guru-Gatrateti-Stabdhgurubhyam-Gatrat-Eti-Stamvadyate</i> ;	Inertness and heaviness of the extremities.

		<i>Stabdhatrat a-Janwader- Anamana- Asamarthyam.</i>	
	<i>Vata-Sopha</i>		Anasarca due to <i>Vata</i> .
	<i>Varna Bheda</i>	<i>Varno-Bhedo Gouradi- Varnanyatvam</i>	Discoloration of skin or change of complexion.
	<i>Glani</i>	<i>Glanihaprahar shah</i>	Fatigue of the sense
	<i>Tandra</i>	<i>Tandra- Indriyartha- Akarmanyata.</i>	Drowsiness
	<i>Nidra</i>	<i>Yada Tu Mansiklante Karmatmano- Klamonwita; Vishayebhyo Nivartante Tada-Swapiti- Manabh (Ch.Sut-21).</i>	When the mind (as well as the soul) gets exhausted or becomes inactive and the sensory and motor organs become inactive the individual gets to sleep.
<i>Kshaye Swaprama nat Shoka- Dhyana Kshayadibh ih</i>	<i>Murccha</i>	<i>Murccha- Itiyadimurccha bijnanendriya- Nirodhah.</i>	Loss of consciousness
	<i>Mamsakshaya</i>		Wasting of muscle
	<i>Mohah</i>	<i>Mohahvaichit yam.</i>	Stupor
	<i>Pralapo</i>	<i>Pralaphasamv addha- Bhasanam.</i>	Delirium
	<i>Maranam</i>		

### Amino acids

A protein is said to be 'biologically complete' when it contains all the essential amino acids in amounts

corresponding to human necessities.<sup>[20]</sup> The quality of dietary protein is closely linked to its pattern of amino acids. So, the smaller units by which protein are made is known as amino acids. Plants can make all the amino acids from simpler substances.

However, animals are unable to synthesis all that as per their requirement and consequently must obtain some 'ready-made' amino acids directly from their food. 22 amino acids are specified to be required by the human body, among them, nine are called essential amino acids and ten for infants for the reason that the body cannot synthesize them in amounts corresponding to needs, and therefore, they must be obtained from dietary proteins.<sup>[21]</sup>

Essential amino acids are leucine, isoleucine, lysine, methionine, phenylalanine, threonine, valine, tryptophan, and histidine. Non-essential amino acids comprise arginine, asparagine, serine, glutamic acid, proline, and glycine.<sup>[22]</sup>

The non - essential amino acids are required to make proteins. These acids can be invented from the essential amino acids in the body. They are made from some of the common amino acids. For example, hydroxyproline is made from proline and it is found in collagen. There is no DNA code for the rare amino acids, they are made from the parent amino acids after they have been incorporated into protein. GABA is virtually unique to the nervous system. It is an inhibitory neuro-transmitter, important in the brain<sup>[23]</sup>. The taste quality of amino acids is influenced by the molecular configuration. Sweet amino acid is primarily found among members of the D series, whereas bitter amino acids are generally within the L series. The taste intensity of amino acids is dependent on the hydrophobicity of the chain. The bitterest amino acids are L-tryptophan & L-tyrosine. D-tryptophan is the sweetest amino acid, is about 37 times as sweet as sucrose. L-Methionine has a sulfur-like flavor. L-Glutamate acid has meat broth flavor.<sup>[24]</sup>

Essential and non-essential amino acids both stand for the synthesis of tissue proteins, the former must be supplied through diet, whereas the latter can be synthesized by the body provided other building blocks

are present. Important biological functions of some essential amino acids are the formation of niacin from tryptophan; the action of methionine as a donor of methyl groups for the synthesis of choline, folates, and nucleic acids. There is evidence that cysteine and tyrosine are essential for the growth of premature babies.<sup>[25]</sup>

The presence of all the essential amino acids (EAA) in the diet is responsible for the formation of new tissues. Amino acid acts as a pioneer of protein synthesis and helps in the detoxification of drugs & metabolic byproducts as a buffer. It also acts as a neurotransmitters.<sup>[26]</sup>

Similarly, deficiency of amino acids in our body is responsible for the decrease in immunity, problems in digestion as well as in the digestive system, depression, fertility issues, lower mental alertness and slowed growth in children. So, amino acids are the most important factors to maintain the *Dhatu*samya (equilibrium condition of all *Dhatu*).

## DISCUSSION

*Ojas* is the supreme *Pranayatanam* out of ten *Pranayatanam* and each *Dhatu* possess their own *Dhatouja*. The respective *Dhatouja* is accounted under *Aparaaja* which is present all over the body.<sup>[27]</sup> Proteins are the basic constituents of all living beings formed from dietary food, it is also made up through the chain of amino acids. Every *Dhatu* poses its *Ojas* in terms of amino acids.

**Table 4: Co-relation between amino acids and Ojas.**

SN	Characteristics	Ojas	Amino acids
1.	Types	Two- <i>Para Oja</i> & <i>Apara Oja</i>	Two-Essential & non-essential
2.	Source	Dietary source	Dietary source (nonessential amino acids can be formed from the essential amino acids in the body)

3.	Taste	<i>Madhur Rasa</i>	D-linked amino acid is sweet; L-linked amino acids are bitter. For example- 4D-tryptophan is the sweetest amino acid, it is 37 times sweet from the sucrose.
4.	Quality of amino acids	-	Quality of <i>Ojas</i> discussed in the above-mentioned table number-1
5.	Prime location	<i>Para Oja-hridaya</i> (heart) <i>Apara</i> (all over the body <i>Oja vaha dhamoni</i> of their respective dhatu)	All over the body.
<b>Function</b>			
6.	Physiological	<i>Bala, Sthirou pochita mamsata, sarvachestasu, apratighat,</i> etc. (Described previous table number-2)	amino acid acts as a precursor of protein synthesis act as a buffer helps in detoxification of drugs and metabolic byproducts act as neurotransmitters and precursors of biological actives oligopeptides
7.	Pathological	( <i>Oja visramsas. Oja vyapod, Oja kshaya</i> ). Described previous table number-3	amino acids deficiency can result in decreased immunity, digestive problem, depression, fertility issues, lower mental alertness, slowed growth in children

According to the quality of the *Ojas* (described above table number-1) which was correlated with those substances, most of them are also made by amino acids such as immunoglobulin, protein, lipoprotein, plasma protein, WBCs, T-lymphocyte, macrophage, etc. The most important T-lymphocyte markers are CD4, CD3, CD8, CD53 all are playing an important role in the field of immunology. For example, the structure CD4 which is the most important marker of T-lymphocyte deduced from cloning the human cDNA holds 435 amino acids.<sup>[28]</sup> CD8 is a transmembrane glycoprotein that serves as a co-receptor for the T-cell receptors (TCR). CD8 is composed of CD8-β and CD8- alpha chain, both members of the immunoglobulin superfamily with an immunoglobulin variable (Ig V) like extracellular domain connected to the membrane by a thin stalk and an intracellular tail. The structure was determined to have an immunoglobulin-like beta-sandwich folding and 114 amino acid residues. CD3 contains two heterodimers made up of a polypeptides chain of 44-81 amino acids.<sup>[29]</sup>

Immunoglobulin molecules are designed of two types of amino acids chain- (H) heavy chain & (L)- light chain. For example-IgG is made by 4 alpha chains of an H-chain of amino acids. Tropomyosin is formed by 284 amino acids helix.<sup>[30]</sup> Fructose absorption is enhanced by the amino acids L-alanine, L-glutamine, and L-proline. Glutamine is the most copious amino acid in the plasma and it is internalized in macrophages via membrane transporter SLC1a5 (solute carrier family 1 membrane 5). In macrophages, glutamine is converted into glutamate by the enzyme.<sup>[31]</sup>

The 22 known amino acids i.e., essential amino acids and nonessential amino acids both affect a broad range of physical and mental processes. Amino acids are cell signaling molecules as well as being regulators of gene expression and the protein phosphorylation cascade which have already been observed in different recent studies. The majority of neurotransmitters can influence mind-body interactions and are composed of amino acids.<sup>[32]</sup>

Additionally, two groups of hormones i.e., thyroid and catecholamine (epinephrine and norepinephrine) both

are derived from the amino acid tyrosine. Physiological concentration of amino acids and their metabolites (e.g., Nitric oxide, polyamines, glutathione, taurine, thyroid hormones, and serotonin) are essential for the biological functions of our body.

However, increased levels of amino acids and their products i.e., ammonia, homocysteine, and asymmetric dimethylarginine all are pathogenic factors and are responsible for the development of neurological disorders, oxidative stress, and cardiovascular diseases. To maintain whole-body homeostasis an optimal balance among amino acids in the diet and circulation possessed a crucial role. Functional amino acids are arginine, cysteine, glutamine, Leucine, proline, and tryptophan which regulates key metabolic pathway that is essential for maintenance, growth, reproduction, and immunity.<sup>[33]</sup>

Consumption of dietary supplementation with one or a mixer of these amino acids may be beneficial for the improvement of health problems at various stages of life cycles (e.g., fetal growth restriction, obesity, diabetes, neonatal morbidity and mortality, weaning-associated intestinal dysfunction, and wasting syndrome, cardiovascular disease, metabolic syndrome, and infertility). Amino acids are also known as building blockers, after joining together they formed proteins and polypeptides. Due to breaking down the certain amino acids chain buildup the harmful substances in the body. It can also optimize the efficacy of metabolic transformation to enhance muscles growth, milk production, egg and meat quality, and athletic performance while preventing excess fat deposition and reducing adiposity.<sup>[34]</sup> To maintain nutritional status and to protect the health of healthy individual amino acids play an important role. Therefore, the function of *Ojas* is identically implied to the function of essential and non-essential amino acids.

## CONCLUSION

Ayurveda has given the significant importance to *Ojas* due to its presence needed exclusively for survival and performing important functions inside the body. Even though this *Ojas* is the essence of all the dhatus inside

the body, its production, maintenance, storage, utilization and proper circulation inside the body must be consistent and proportionate. Around 300 amino acids are available in nature. Instead, some of them appeared early, while others were added to the genetic code later. It is necessary to take them in the diet because their deficiency results in decreased formation of protein and ultimately leads to other health hazards. So, prime essential factors of the body appropriately can be co-related with protein (amino acids) in terms of *Ojas* whereas non-essential amino acids in terms of *Aprauja*. Therefore, the function of *Ojas* is identically implied to the function of essential and non-essential amino acids.

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