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Concept Of *Rasadhatu* In *Ayurvedic* Perspective In Comparison With Plasma / Lymph - A Conceptual Study

Brijesh R Mishra*[1], Shweta G Nimkarde[2]

1. Professor & HOD,
2. 2nd Year PG Scholar, Email Id- dr.shwetanimkarde@gmail.com, Mobile - +918888334252

Department of Post Graduate Basic Principles Of Ayurveda & Samhita, Shri Ayurved Mahavidyalya (Govt. of Maharashtra Grant In Aid) Nagpur, Maharashtra, India

***Corresponding Author: Email ID. Dr_brijeshm@yahoo.com, Mobile - +919821364155**

Abstract : *Dhatu's* are of great importance in *Ayurveda. Ayurveda* gives specific treatment methods for diseases related to diffrent *dhatu's.* The human physical body is composed of *Saptadhatu's* namely *Rasa, Rakta, Mamsa, Meda, Asthi, Majja, Shukra*[1]. *Dhatu* are basically the body tissues which are responsible for the functioning of the system and organs and the structures of the body.

According to *Ayurveda Rasa* is the first *dhatu* which is the primary constitution of human body is otherwise known as Plasma / Lymph. It basically represents the fluids of the extracellular and intracellular portions of the body and it mainly nourishes and strengthens the blood.

Keywords : *Dhatu, Rasadhatu*, Plasma, Lymph

Introduction :

" *Sharira Dharanat Dhatavah*"[2], *dhatu*'s means tissue of body. Those which hold the body called *Dhatu's.* The *dhatu's* being structural components take part in body construction. An increase or decrease in their quantity indicates metabolic disorders and decrease in quantity leads to lowering of immunity. They are integral to understanding the relationships of the tissues in the body, and they are sites that *dosha's* enter when they cause disease. An understanding of the seven *dhatu*'s is important to understanding pathology; what goes wrong in the body.

According to *Ayurvedic* system of medicine, *rasa* represents the first *dhatu*. *Rasa* is the major and primary constituent of the human body. *Rasa* represents the fluids (extra cellular and intra cellular parts) of the human body and it mainly concerned with nourishment and strengthening the blood. once the process of digestion of the food is complete, it gets converted into a

liquid (chyle)which undergoes transformed into blood tissue.

Materials & Methods :

References related to proposed title are collected from classical texts of *Ayurveda*. Various publications, internet, books, and proceedings of seminars related to the topic are collected.

Review of *Rasa Dhatu* :

- ***Vyutpatti* and *Nirukti* of *Rasa*** :
- *Sharirasyadhatushu prathamdhatau (Vaidyakashabdasindhu)*
- *Rasaha , pum (rasatiti | ras + pachadyach +yawa rasyate iti | (shabdakalpadrum)*
- *Tatra rasagatau dhatuha aharaha gacchati iti rasaha (Sushruta)*[3]

Synonyms of *Rasa* : *Saumya dhatu , Ahara – Prasad, Agni – sambhav , Asrik - kar*

***Sthana* of *Rasa* :** As it is one of the seven *dhatu,* it is present in the entire body. Location of *Rasadhatu* is heart and *dasha dhamani's* emerge from heart and circulating in entire body nourishes all tisses.[4]

***Rasa Brahman* :**Circulation is main function of *Vyana*. It circulates in entire body at a time. This act of circulation is ceaseless and done all the time.[5]

Constitution of *Rasadhatu* :Every substance is made up of five *Mahabhuta*. *Rasa dhatu* has dominance of *'Aap' mahabhuta*. Its fluid nature is due to *aap mahabhuta*. It holds *Teja* also in predominance.[6]

Quantity of *Rasadhatu* :*Rasadhatu* formed from the digested food measures about 9 *anjalis*. (3 *anjali* = 1 litre).

Functions of *Rasa dhatu*[7] :*Tarpana* - Nourishes people of all ages.

Vardhana - Growth and development .

Dharana (Jeevana) - Stabilizes the *dhatus* and keeps them intact in the middle age.

Yapana - Prevents them from getting totally depleted.

Snehana : Keeps the body parts, tissues lubricated.

Avashtambana : Stabilizes the body and its components.

Tushti : Provides saturation and satisfaction.

***Rasa dhatu Vriddhi lakshana* :** The symptoms of *rasa vriddhi* are similar to *kapha vriddhi*. They are as below mentioned as [8]*Agnimandya , Praseka , Aalasya , Chardi , Swet varna , Gaurav,Shwaitya , Shaitya , Anga shaithilya , Shwasa , Kasa , Atinidra* .

Rasa dhatu Kshay lakshana : When *Rasa* deficiency occurs, the normal functions including nutrition which is conducted by *Rasa* gets obstructed. Thus the body gets deficit nutrition.[9] *Mukha shosha , Sharira shosha , Karshya , Trushna , Shunyata ,Shrama , Shabda Asahishnuta , Hrudaya ghattana , Hrut Kampa , Hrut drava , Hrut shula , klama* .

***Rasapradoshaj Vyadhi* :** *Ashraddha , Aruchi , Asya vairasya, Aarasgandhata , Hrillas , Pandutva , Strotorodh, Jwara, Angamard , Napumsaktwa , Saada , Krushtwa , Akalpalitwa.*[10]

Rasa Pradoshaj vyadhi chikitsa **-** In the management of vitiation of *Rasavaha srotas* and the disorders of their origin, all types of *Langhana* should be followed.[11] *Langhana* means lightening therapies (which produce lightness in the body). *Langhana* is of 10 types –*Vamana , Virechana , Shirovirechana (nasya) , Niruha basti , Pipaasa, Maruta , Aatapa , Pachana , Upavasa , Vyaayaama .*

***Rasa Dhatu Updhatu* :** *Rasa dhatu* is the essence of nutrition that circulates through the arteries. it is correlated with lymphs, plasma or simply quoted as nutrition in circulation. *Updhatu* or sub - tissue of *Rasa dhatu* are - *Stanya* (breast milk) and *Aartava* (menstrual blood).[12]

***Rasa Dhatu Mala* :**.*Kapha* or phlegm is the mala of *rasa dhatu*. This *kapha* is injurious to the *rasa dhatu* if it is held back. Therefore the *kapha* is expelled from the tissue.[13]

***Rasavaha Strotas* :**According to *Charaka* , the root of origin of *Rasavaha strotas* lies in -*Hriday Dasha Dhamanis* .[14]

Causes of *Rasavaha Strotodushti*[15] - *Guru aahara , Sheeta aahara , Ati snigdha , Ati maatram , Ati chintanaat .* According to *Sushruta –Rasavaha srotas* or channels carrying the nutritive essence to every part of the body are 2 in number. They have their roots in – *Hriday ,Rasa vahini dhamnees* .[16]

Symptoms of damage or injury to *Rasavaha srotas –Shosha ,Pranvaha srotas viddha lakshana Maranam.*

Rasa Sarata* :Rasa dhatu* and skin have a proximal relationship. This richness (in terms of quality and quantity) or deficiency of *rasa dhatu* are shown or reflected on skin.[17]Following are signs of high quality *rasa dhatu* in the body – *Snigdha ,Slakshna Mrudu,Prasanna twak ,Saprabhava , Alpa,Gambheera roma ,Sukumara.*

The *Twak Sarata* or Skin with enriched qualities denote - *Sukha ,Saubhagya ,Aishwarya ,Upbhoga ,Buddhi ,Vidya ,Arogya Praharshan ,Aayushyatwa.*

Pslasma / Lymph : *Rasa dhatu* is primarily involved in the function of *prinana* or carrying and providing nutrtion and nourishment to all the cells in the body. This function is rendered by the blood. But *Ayurveda* has explained *Raktadhatu* or blood tissue as the second tissue in the chronology of the tissues .The blood has two components, one is the liquid portion called plasma or lymph and the other is cellular which compromise of red blood cells, white blood cells, blood platelets etc. the fluid component of the blood can be taken as *Rasdhatu* and the cellular portion is *Raktadhatu.*The whole water content of the body is seen in 02 forms –**01-**Intra cellular fluids (fluid which is present within the cells)**.02-**Extra cellular fluid (fluid which is present outside the cells)

The distribution of extracellular fluid in the body can be seen in the forms of – Trans cellular fluid –Ex. Cerebrospinal fluid (CSF), peritoneal fluid (present between the layers of membranes covering the abdominal viscera), pleural fluid (present in between the layers of membranes covering the heart) etc.

Interstitial or tissue fluids – Surrounding and bathing the cells of the tissue ,fluid of connective tissues

Intravascular fluid –This is the fluid present in the blood vessels. This is of 2 forms –Plasma ,Lymph

Plasma –It is the clear, straw colored liquid portion of the blood that remains after the red blood cells, white blood cells, platelets and other cellular components are removed. It is single largest component of the human blood, comprising of about 55% and contains water, salts, enzymes, antibodies and other proteins. It normally holds the blood cells in whole blood in suspensions. It forms the extracellular matrix of red cells. Plasma also serves as the protein reserve of the human body .It plays a vital role in an intravascular osmotic effect that keeps electrolytes in balanced form and protects the body from infection and other blood disorders.

Functions of Plasma –

Transport Nutrition –One of the most important functions of the plasma is to transport nutrients throughout the body. As food is digested in the stomach and intestine, it is broken down into its components. This includes amino acids, lipids, sugars and fatty acids. These nutrients are distributed to the cells throughout the body where they are utilized to maintain healthy functions and growth.

Transport wastes –The plasma also transport waste products such as uric acid, ammonium salts, creatinine etc from the cells to the kidneys. The kidneys filter these wastes out of the plasma and excrete them through urine.

Maintains blood volume –About 7% plasma is made up of protein, mainly albumin (protein important for tissue repair and growth). This concentration is important for maintaining the osmotic pressure of the blood. Albumin also if found in the fluids surrounding the cells (interstitial fluid).The concentration of albumin in this fluid is lower than that present in the plasma. Because of this, water is not abl to move from the interstitial fluid into the blood .In the absence of plasma albumin, water would move into the blood and increase the blood volume. This would lead to increase in blood pressure. This also would impart high work load over the heart.

Balance electrolytes –Plasma has salts called as electrolytes. They include sodium, calcium, potassium, magnesium, chloride and bicarbonate. These electrolytes are essential for many body functions. Example, contraction of muscles, transmission of nerve impulses and signals etc are some of the important functions of electrolytes.

Provides body defense or immunity – Plasma also carries other proteins called immune-globulins (antibodies). They fight off foreign substances like bacteria and protect the body. Fibrogen is a protein necessary to help the platelets to form blood clots. By carrying these proteins, the plasma is playing a critical role in defending the body against infection and blood loss.

Lymph –Lymph is nothing but another form of plasma which has come out of the blood vessels because almost all the constituents of the plasma are more or less same in the lymph also .It contains lymphocytes and other white blood cells. It also contains waste products and cellular debris along with bacteria and proteins .The lymphatic system is a network of tissues and organs that help rid the body of toxins, waste and other unwanted materials. The primary function of the lymphatic system is to

transport lymph. The lymphatic system primarily consists of lymphatic vessels, which are similar to circulatory systems veins and capillaries .The vessels are connected to lymph nodes, where the lymph is filtered. The tonsils, adenoids, spleen and thymus are all part of the lymphatic system .The plasma constituents which fail to enter the venous system will form the lymphatic system. This system starts from sub – cutaneous tissue, muscle spaces, abdominal and thoracic organs in the form of lymph capillaries .The lymph capillaries of intestinal villi which carry the absorbed fat are known as lacteals. These lacteals join the left thorasic duct. The left thoracic duct drains from the lower limbs and abdominal viscera and left upper limb .The right part of the chest and right upper limb are drains by right lymph duct. Both right and left thoracic ducts drain their contents into right atrium by joining right lymphatic duct and left sub clavian vein respectively.

The lymph flow depends upon – Interstitial pressure, arterial pulsation, intra thoracic pressure and muscular massage.

Functions of Lymphatic's –Removes interstitial fluid from tissues .Absorbs and transports fatty acids and fats as chyle from the digestive system Transports white blood cells to the lymph nodes and from lymph nodes into the bones .Transports antigen-presenting cells, such as dendritic cells, to the lymph nodes where an immune response is stimulated.

Since blood plasma is an important part of the blood, thrown into the circulation by the heart *(rasa vaha srotas*), it can be correlated with *' rasa dhatu'* due to its similarity in terms of appearance, functions and circulation .The human circulatory system processes an average of 20 litres of blood per day through capillary filtration which removes plasma while leaving the blood cells. Roughly 17 liters of the filtered plasma are reabsorbed directly into the blood vessels, while the remaining 3 liters remain in the interstitial fluid.

One of the main functions of the lymph system is to provide an accessory return route to the blood for the surplus 3 litres. Thus lymph also forms an important part of the circulatory system and can be included under *rasa dhatu*, if not in true terms as in case of plasma which has a completed circuit, starts and ends in the heart, which is *Rasavaha srotas*.

The lymph is doing the same job of *Sthayee Rasa Dhatu (poshak rasa dhatu* or *rasa dhatu* in circulation) like filtering the toxins etc. thus plasma and lymph can be correlated with *rasa dhatu.*

Discussion : *Rasa* is the main dhatu in the body which produce directly from *annarasa* and it is one of the vital tissues for the nourishment and devlopment of body. Because of this remaining *dhatus* are formed, nourished and it helps for the overall development of the body. If the *rasa* is not formed properly or if it is contaminated it leads to many systemic diseases .*Rasa* gets matured and processed over a period of one month and at the end of the month, the rasa gets converted into the *shukra* (semen) in men and *aartava* (menstrual blood, ovum) in woman. *Rasa* majorly nourishes *Rakta dhatu* and in quick time too, whereas the same *rasa* nourishes the *raja* or *aartava* in small proportions and in slow time. Therefore it takes one long month for the *aartava* to get properly

nurtured and get manifested during monthly periods, while *rakta dhatu* is regularly produced.Proper circulation of *Rasa dhatu* keeps all the physical and mental functions (activities) in regular rhythm. Since *Rasa* is responsible for all the activities in the body it is also called '*ojus*' or 'essence of life'. It is therefore essential to save *Rasadhatu* in body and to keep it in physiological condition.

Conclusion : Based on the conceptual study and discussion the following conclusions can be drawn .The tissue system of the body consist of seven kinds of basic tissues or *Sapta dhatu's*.One among those is *Rasa*. It is formed by the canalization of *Rasagni* on *Ahara rasa*. *Rasa* contributes to the formation of *Rakta* by transporting nutrient substances which are the homologous of *Rakta dhatu* . *Aap Mahabhuta* is predominant in *Ras dhatu* so all properties of *Kaphadosha* are applied to *Rasadhatu*. *Rasadhatu* in form of excel part of *dhatu* nourishes body, which is called '*Oja'*. *Rasadhatu* circulates in the body and supplies nutrients to all *dhatu* and is responsible for the existence, support and maintenance of body.

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