



Review Article

PHYSIOLOGICAL AND PATHOLOGICAL ASPECTS OF RAKTHA DHATHU

Ramesha. H S¹, Hithaishi D^{2*}

¹CRAV at Arya Vaidya Sala Kottakkal, MD in Roga Nidana evum Vikriti Vigyana.

^{2*}Assistant Professor, Department of Roganidana & Vikriti Vigyana, Ashwini Ayurvedic Medical College, Tumkur.

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ABSTRACT

According to Ayurveda, the seven essential body tissues, known as *Sapta Dhatu*, comprise *Rasa, Raktha, Mamsa, Meda, Asthi, Majja*, and *Shukra*. These *Dhatu* are defined as per their function. These are important for healthy state of the body. *Raktha Dhatu* is second one in the sequence of *Sapta Dhatu*. *Raktha Dhatu* can be understood in term of blood in contemporary science. The word *Raktha* is originated from Sanskrit word '*Raj Ranjane*' meaning is to stain, means if white cloth is stained with this *Dhatu*, it become red coloured hence it is called as *Rakta*. As it is one of the seven *Dhatu*, it is present in entire part of the body. However it may present in large quantity in some places and may be functioning specifically in context to some organ, such places are known as *Sthana* of the *Rakthadhatu* is *Rakthavaha Strotas* is the main site of *Raktha Dhatu*. Principle organs of this *Strotas* are liver and spleen.

INTRODUCTION

Dosha, Dhatu, and *Mala* are considered as the three fundamental components of the human body.^[1] *Dhatu* performs *Dharana Karma*^[2] among them, the second one is *Raktha Dhatu* with the aid of *Rasa Dhatwagni* and *Bhutagni*,^[3] produced from the *Prasada Bhaga* of *Rasa Dhatu*. Its *Gunas*, such as *Sneha, Ushna, Tikshna*, and *Drava*, are comparable to *Pitta Guna*. It flows throughout the body from *Hridaya* through *Dhamanis* and performs *Shareera Jeevana* and *Mamsa Pusti karma*.

By looking at the characteristics of *Raktha Dhatu*, one may identify it as the fluid component that nourishes every tissue and organ in the body by travelling throughout the body via the heart and blood vessels. Thus, it is understood to be blood. The presence of haemoglobin in RBCs is what gives blood its red colour. *Raktha Dhatu* might be viewed as the entire blood in such a horrible way. Similar to RBCs, *Rasa Dhatu* can be thought of as a component of blood.

The *Rakthavahi Dhamini* was added by *Acharya Suhsruta*. *Raktha Dhatu* also plays role in genesis, sustains, and is responsible for death, as much as *Dosha*. It produces *Daha, Prabha, Varna, Prakasa*, and aids in *Pachana*.

Nirukti of Raktha Dhathu

The Sanskrit word "*Ranj*," which means to dye or colour, impact or move, excite/glad/charm/delight, is the source of the word "*Raktha*."

Synonyms of Raktha dhathu

Rudhira - *Runadhi Rudhyate Iti Va* is the source of the word *Rudhira*^[6] *Rudhira* refers to *Dharana* and *Samrakshan*. *Acharya* identified *Rudhira* as the component of *Prana* in the *Charaka Samhita*.

Asruka - The word "*Asu Kshepane*" is the origin of the name "*Asruka*." Given that it flows continually throughout the body and is referred to as *Asruka*, the word meaning of this indicates *Vikshepana*.

Lohita - The word *Lohita* is derived from the words "*Ruh Rohini*" or "*Rudhyate*." Additionally, the word "*Lohita*" is derived from "*Loha Sanjayate Asyam*," indicating that it is given the name *Lohita* because it contains *Loha*. Our *Acharya* learned that *Loha* is crucial for blood formation from *Vaidika Kala*.

Shonitha - "*Shonah Sanjata Asya Iti Shonitam*" is the source of the word "*Shonita*." This denotes a liquid element of the colour red.

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Asra- This word stems from "*Asra Dhatu*" by adding "*Rak Pratayaya*." It resembles *Shonita*.

Raktha: When colourless *Rasa Dhatu* transforms into a liquid element with a red colour, it is known as *Rakta*.

Kshataja- *Raktha* is the first element to become evident upon injury, hence the name was given.

Panchabhoutikatva of Raktha Dhathu

Raktha dhatu is predominantly due to *Teja* and *Jala mahabhuta*.

Five Qualities of <i>Raktha Dhatu</i> ^[7]	<i>Mahabhuta</i>
<i>Visrita</i> - Freshly odour	<i>Prithvi</i>
<i>Dravata</i> - Fluidity	<i>Jala</i>
<i>Raaga</i> - Red colour	<i>Teja</i>
<i>Spandana</i> - Pulsation	<i>Vayu</i>
<i>Laghuta</i> - Lightness	<i>Akasha</i>

Utpatti of Raktha Dhathu

Teja imparts this red colour to *Rasa Dhatu* in a live organism, and when it is produced in a healthy manner and in physiological quantities, it is termed *Raktha* and is considered fresh. After reaching *Yakrit* and *Pleeha*, this *Rasa Dhatu*, despite being *Apya*, acquires red colour as a result of *Ranjaka Pitta* activity. According to *Acharya Charaka*, *Rasa* develops redness when the *Teja* component of *Ahararasa* and *Pitta* (*Ranjaka Pitta*) with *Ushma* forms *Raktha*.

Sthana of Raktha dhathu

The *Mula* of *Rakthavaha Srotas* is *Pleeha* and the *Yakrit* and found abundant in various locations and serves particular purposes for certain organs. According to *Acharya Sushruta*, blood arteries that carry *Raktha* to even the tiniest parts of the body are said to be a root of *Rakthavaha Srotas*. The *Pleeha* and *Yakrit* are where *Raktha Dhatu* is formed. Blood vessels, the spleen, and the liver all contain

Etiological Factors of Raktha dusti

<i>Aharaja</i>	<i>Viharaja</i>	<i>Kalaja</i>	<i>Manasika</i>	<i>Vysantah</i>
<i>Katu, Amla, Lavana, Rasa Sevana</i>	<i>Divaswapna</i>	<i>Sharad rtu</i>	<i>Krodha</i>	<i>Madya</i>
<i>Kshara</i>	<i>Atyadana</i>			<i>Sura</i>
<i>Kulattha</i>	<i>Atapa sevana</i>			
<i>Masha</i>	<i>Anila sevana</i>			
<i>Tila taila</i>	<i>Vega Avarodha (Chardi)</i>			
<i>Pindalu</i>	<i>Shrama</i>			
<i>Mulaka</i>	<i>Abhighatha</i>			
<i>Jalaja Anupa mamsa</i>	<i>Adhyashana</i>			
<i>Dadhi</i>	<i>Ajeerna ashana</i>			
<i>Viruddha Ahara</i>				

Rakthadhara Kala. The spleen and liver are regarded as the system's regulating or *Rakthashaya* (organ where blood is kept) organs.

Qualities of Shuddha Raktha

Vagbhata^[8] in *Ashtanga Hridaya* mentioned that *Shuddha Rakta* is identical to *Padma, Indragopa, Sama Shitoshna, Asamhata*, and that it is *Madhura, Lavana, Sama Shitoshna*, and sheep and *Shasha Raktha* (rabbit). The same characteristics of *Shuddha Raktha* were also mentioned by *Vridha Vagbhata*. He assured us that after cleaning, *Shuddha Rakta* leaves no stains on our clothes. By nature, it shares traits with *Saumya-Agneya* and *Pitta*.

According to *Sharangdhara*, the *Raktha Dhatu* that sustains life is *Snigdha, Guru, Chala*, and *Madhura* in nature.

The colour of *Shuddha Raktha* can be compared to that of gold that has been cleansed with fire, *Indragopa*, crimson lotus, and *Gunja (Abrus precatorius)* fruit. *Anushnashita Dhatu* is *Rakta Dhatu*. It responds to things that influence *Pitta*.

Raktha dhathu saaratha

The following characteristics are present in people who have *Uttama Raktha Dhatu Sarata*: red-colored ears, eyes, oral cavity, tongue, palms, soles, nails, forehead, and penis. These organs have a shiny, lustrous appearance. They possess beauty, enjoyment, and knowledge.

Lakshana of Vishuddha raktha purusha

When *Raktha dhatu* in balanced state then the following symptoms should be seen. Cheerful healthy complexion, energetic active sense organs, proper inclination of sense organs towards their subjects, proper digestion, unobstructed natural urges, healthy nourishment of body.

Raktha Dhathu Pradoshaja Vikara

Rakthapradoshaja vikaras are explained in the *Charaka Samhita* at two different points in *Sutrasthana* itself, namely in *Vidhishonitiya adhyaya* and *Vividhasitapitiya adhyaya*. *Acharya Susruta* explained in *Sutrasthana* in the chapter of *Vyadhi samuddesheeya adhyaya*.^[10]

Vyadhi	Charaka Samhita	Sushruta Samhita	Bhela Samhita
<i>Kushta</i>	+	+	+
<i>Visarpa</i>	+	+	-
<i>Pidaka</i>	+	+	-
<i>Raktapitta</i>	+	+	-
<i>Asrikdara</i>	+	+	-
<i>Gudapaka</i>	+	-	-
<i>Medhrapaka</i>	+	-	-
<i>Aasyapaka</i>	+	-	-
<i>Pleeha</i>	+	+	-
<i>Gulma</i>	+	-	-
<i>Vidradhi</i>	+	+	-
<i>Neelika</i>	+	-	-
<i>Kaamala</i>	+	-	-
<i>Vyanga</i>	+	+	-
<i>Piplu</i>	+	-	-
<i>Tilakaalaka</i>	+	+	-
<i>Dadru</i>	+	-	-
<i>Charmadala</i>	+	-	+
<i>Paama</i>	+	-	+
<i>Kotha</i>	+	-	-
<i>Asramandala</i>	+	-	-
<i>Mashaka</i>	-	+	-
<i>Nyaccha</i>	-	+	-
<i>Indralupta</i>	-	+	-
<i>Vatharaktha</i>	-	+	-
<i>Arshas</i>	-	+	-
<i>Arbuda</i>	-	+	-
<i>Angamarda</i>	-	+	-
<i>Kacchu</i>	-	-	+
<i>Vicharchika</i>	-	-	+

Raktha Vriddhi

The symptoms of increased *Raktha Dhatu* include reddening of the skin and eyes, engorgement of blood vessels, and overconsumption of greasy, pungent food due to the hot climate. Red eyes, skin, and urine with bleeding can occasionally occur as a result of an increase in *Raktha Dhatu* *Visarpa*, *Pleeha* *Vidradhi*, *Kushtha*, *Vatarakta*, *Raktapitta*, *Gulma*, *Upakusha*, *Kamla*, *Vyanga*, *Agninasha*, and *Sammoha*.^[11]

Raktha Kshaya

Raktha Dhatu decreases as a result of malnutrition and poor diet. Rough skin, a need or desire for sour and chilly items, and leaky veins are all effects of *Shonita Kshaya*. Any time *Raktha Dhatu* is lost, all other *Dhatu* experience *Kshaya* and *Vata* becomes vitiated.^[12]

DISCUSSION

Blood in Ayurveda

A connective tissue that is fluid in nature is blood and it is an important element in maintaining a stable internal environment in our body. It is important for the continuation of life, together *Rasa* and *Raktha Dhatu* can be regarded as blood because they both circulate as liquids in the intravascular compartment. While describing the circulation of *Rasa* by the action of *Vyana Vayu*, Chakrapani has explained the term *Rasa* as “*Rasateeti Raso Dravadhatuuchayate Taenrudhiraadinaamapi Dravaanam Grahanam Bhavati*”, where the term *Rasa* stands for intravascular circulating fluid i.e., plasma including the blood cells. While discussing how *Rasa* circulates in the heart and blood vessels, *Bhela* also used the word *Rasa*. So, the phrase “*Rasa-Raktha*” refers to the smallest and most important substance that has been fully digested (nutrients absorbed in blood). *Rasa* is transparent and colourless, hence it relates to plasma; *Raktha*, which is to be red in colour like *Gunjjaphala* (fruits of *Abrus precatorius*) and *Padma* (*Nelumbo nucifera*), can be interpreted as Red Blood Cells (RBCs), while White Blood Cells (WBCs) can be interpreted as *Shonitarupi Oja*.

Our *Shareera*, is composed of and governed by the principles of *Tridosha*, *Sapta Dhatu*, and *Mala*. After the complete digestion of food, the first *Dhatu* that forms are known as *Rasa* due to its constant circulation, *Preenana* performs *Rasa Dhatu* role (nutrition). As there is reference about *Pranayatana* the ten seats of *Prana*, *Raktha Dhatu* has traditionally been regarded as the most important among *Sapta Dhatu*.

Raktha is crucial in maintaining life, as acute blood loss of more than 10% can result in potentially deadly diseases such hypovolemic shock. Because blood provides nourishment to all tissues and if it is inadequate, this will result in inappropriate nutrition of other tissues, ischemia, and hypoxia, which in turn causes tissue death, it is also accountable for the growth or decline in other *Dhatu*s. As a result, the condition of *Rasa-Rakta Dhatu* will determine the nutritional health of all tissues.

With respect to the other three *Doshas-Vata*, *Pitta*, and *Kapha-Acharya Sushruta* recognised *Rakta* as the fourth *Dosha* because of its enormous physiological significance. The four humors- blood, phlegm, yellow bile, and black bile-were also thought to be the controllers of all physiological processes in the body by ancient Greek medical researchers. Blood (*Dam*) has been regarded as a humour in Unani medicine as well. As a result, various branches of ancient medicine understood the significance of blood in preserving the

body's balance. Certain physiological, psychological, and somatic characteristics connected to these *Dhatu* have been characterised under the investigation of *Dhatu Sarata* in order to gauge the functional sufficiency of *Rasa-Raktha Dhatu* in an individual (excellence of tissues).

CONCLUSION

The *Rasa* and *Raktha Dhatu* might be regarded as blood given the previous explanation since they both exist in a *Drava* state, which circulate inside the intravascular compartments, and share similar physiological functions. The action of *Vyana Vata* on the heart and blood vessels causes it to be distributed throughout the entire body. It is quite similar to blood and shares significant functional similarities with it. All the essential nutrients are carried by the *Rasa-Raktha Dhatu* along with *Oja*, which nourishes and safeguards all the tissues. To clinically evaluate the functioning status of a certain *Dhatu*, the greatest qualities of *Rasa* and *Raktha Dhatu* and *Dhatu sarata* have been described. It has been mentioned that a number of factors, including diet and routine, *Deshasatmya*, *Kalasantmya*, and *Oakasantmya*, affect the production of *Shuddha Raktha Dhatu* and may result in a number of blood illnesses. These detailed descriptions reveals that ancient Ayurvedic scholars possessed a profound understanding of blood physiology and its practical applications, and the scientific explanations provided here can facilitate a deeper comprehension of this article.

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***Address for correspondence**

Dr. Hithaishi D

Assistant Professor,

Department of Roganidana &

Vikriti Vigyana, Ashwini Ayurvedic
Medical College, Tumkur.

Email: hithu505@gmail.com

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