



## A PHYSIOLOGICAL STUDY OF RAKTA DHATU

Dr. Bhanu Pratap Singh<sup>\*1</sup>, Dr. Om Prakash Dadhich<sup>2</sup> and Dr. Deepa<sup>3</sup><sup>1</sup>MD (Sharira Kriya), NIA, Jaipur, Rajasthan, India.<sup>2</sup>Professor and HOD, Dean Academic, Dept. of Sharira Kriya, National Institute of Ayurveda, Jaipur, Rajasthan.<sup>3</sup>M.D. (Sharira Rachana), Medical Officer, Rajasthan.**\*Corresponding Author: Dr. Bhanu Pratap Singh**

MD (Sharira Kriya), NIA, Jaipur, Rajasthan, India.

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## ABSTRACT

In Ayurveda, *Dosha*, *Dhatu* and *Mala* are the basic blocks upon which the body stands. Out of these, *Dhatu* mainly perform the function of holding- together the bodily elements. There are seven *Dhatu* in person; these are *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja* and *Shukra*. *Rakta Dhatu* is a very important component of our body and its *Moola Sthana* are *Yakrita* and *Pleeha*. *Sushruta* mentioned that *Rakta Dhatu* is base of living body; it maintains life, so one should take proper care of *Rakta Dhatu* by proper diet that gives nourishment to *Rakta* and by following proper regimen to benefit *Rakta*.

**KEYWORDS:** Ayurveda, Dhatu, Dosha.

## INTRODUCTION

Ayurveda is the oldest system of healing and provides service to mankind in which body physiology is too much emphasized to understand the aetiology and pathogenesis of a disease, so that the best treatment can be searched out for the benefit of humanity. It is told in Ayurveda that *Dosha*, *Dhatu* and *Mala* are the basic blocks upon which the body stands.<sup>[1]</sup>

According to Ayurveda, there are seven *Dhatu* in person; these are *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja* and *Shukra*. These *Dhatu* are defined as per their function. These are important for healthy state of the body. *Rakta Dhatu* is second one in the sequence of seven *Dhatu*. *Rakta Dhatu* can be compared to Blood in modern science but Ayurvedic texts reveal that *Rakta Dhatu* has much broader concept than blood.

## MATERIALS AND METHODS

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

## REVIEW OF RAKTA DHATU

**Vyutpatti and Nirukti of Rakta**

The *Vyutpatti* (derivation) and *Nirukti* of *Rakta Dhatu* is described in various forms in different literatures like - *Ranja Karane Kta* (*Vachaspatyam*), *Raktam Kli* (*Ranjyatengamaneneti*, *Ranja+Kta*) (*Shabdakalpadruma*).

**Synonyms of Rakta**

**Rudhira**- The word *Rudhira* is derived from “*Runadhi Rudhyate Iti Va*”. The word *Rudhira* denotes *Dharana* and *Sanrakshan*. In *Charaka Samhita*, *Acharya* has mentioned the element which comprises *Prana*, is *Rudhira*.

**Asruka**- *Asruka* word is derived from “*Asu Kshepane*”. The word meaning of this denotes *Vikshepana*, as it moves continuously all over the body named as *Asruka*.

**Lohita**- The word *Lohita* is obtained from “*Ruh Rohini*” or “*Rudhyate*”. Besides this, word *Lohita* is derived from “*Loha Sanjayate Asyam*” which indicates that as it contains *Loha*, it is named *Lohita*. From *Vaidika Kala*, our *Acharya* knew that *Loha* is essential for blood formation.

**Shonita**- It derives from “*Shonah Sanjata Asya Iti Shonitam*”. This indicates red colour liquid element.

**Asra**- By adding ‘*Rak Pratayaya*’ to ‘*Asra Dhatu*’, this word derives. It is similar to *Shonita*.

**Rakta**- When colourless *Rasa Dhatu* changes into red coloured liquid element, it is called *Rakta*.

**Kshataja**- After injury the first element which will be visible is *Rakta*, so it is called *Kshataja*.

### Importance of Rakta

*Sushruta* said that *Rakta Dhatu* is base of living body; it maintains life, so one should take proper care of *Rakta Dhatu* by proper diet that gives nourishment to *Rakta* and by following proper regimen to benefit *Rakta*.<sup>[2]</sup> Out of ten vital points, *Rakta* is one; hence utmost care should be taken of *Rakta*.<sup>[3]</sup>

*Sushruta* said that there will be no existence of the body without *Kapha*, *Pitta*, *Vata* and even *Shonita*. The body is always supported by these.<sup>[4]</sup> He described that *Rakta Dhatu* is extremely important for sustenance of life. It is therefore needed to protect this *Dhatu* by every possible measure. As *Vata-Pitta-Kapha* are responsible for the creation of living body, fourth entity named *Rakta* is also responsible for the existence, support and maintenance of body. He told that *Rakta* itself is life.

Commentator *Dalhana* explains the reason as to why *Sushruta* gave so much importance to *Rakta Dhatu*. He states that *Sushruta*, as surgeon had to primarily think about *Rakta Dhatu*. *Sushruta* told that body is basically dependent on food and four factors are responsible for any deviation of body from its homeostatic status namely *Vata*, *Pitta*, *Kapha* and *Rakta*.

### Utpatti of Rakta Dhatu

In living body, *Teja* brings this red colour to *Rasa Dhatu* and when produced in healthy manner and in physiological quantity; it is fresh and called *Rakta*.<sup>[5]</sup> This *Rasa Dhatu* though *Apya* (liquid, possessing and actions of water), after reaching *Yakrit* and *Pleeha* attains red colour due to the action of *Ranjaka Pitta*.<sup>[6]</sup> *Charaka* said that when *Teja* portion of *Ahararasa* and *Pitta* (*Ranjaka Pitta*) with *Ushma* acts upon *Rasa*, it acquires redness. This is finally *Rakta Dhatu*.<sup>[7]</sup>

*Chakrapani* states that the *Rasa Dhatu* circulating in the body is of two types: *Sthayi* and *Poshaka*. It is the *Poshaka Dhatu* which circulates all over the body in *Dhamani*. The *Poshaka Dhatu* is the one which provides nourishment to the *Sthayi Dhatu*. According to *Sharangdhara*, *Rasa* reaches *Hridaya* with the help of *Samana Vata*. There it gets *Pachita* and *Ranjita* by the *Pitta* and attains *Raktata*.

### Sihana (Site) of Rakta

As it is one of seven *Dhatu*, it is present in the entire body. It is present in large quantity in some places and functions specifically in context of some organs. Such places are locations of this *Dhatu*. Liver (*Yakrit*) and spleen (*Pleeha*) are roots of *Raktavaha Srotas*.<sup>[8]</sup> According to *Sushruta*, blood vessels supplying *Rakta* to every smallest structure of the body is also a root of *Raktavaha Srotas*. Liver and spleen are sites of formation and vitiation of *Rakta Dhatu*.<sup>[9]</sup>

*Raktadhara Kala* is present inside liver, spleen and blood vessels. It is concerned with formation and storage of *Rakta Dhatu*.<sup>[10]</sup> Liver and spleen are considered as

*Raktashaya* (organ where blood is stored) or controlling organs of this system.<sup>[11]</sup>

### Constitution of Rakta Dhatu

Every substance is made of five *Mahabhuta*. Hence they are also present in *Rakta Dhatu*. It's typical odour is due to *Prithvi Mahabhuta*, its fluid nature is due to *Apa Mahabhuta*, red colour is due to *Teja Mahabhuta*, its flow gets palpated due to *Vayu Mahabhuta* and it is light due to *Akash Mahabhuta*.<sup>[12]</sup> In spite of existence of five *Mahabhuta*, *Rakta Dhatu* has dominance of *Teja* and *Jala Mahabhuta*.<sup>[13]</sup>

### Functions of Rakta

To keep individual alive is chief function of *Rakta Dhatu*.<sup>[14]</sup> *Rakta* brings lustre to skin colour, nourishes *Mamsa Dhatu* and keeps an individual alive.<sup>[15]</sup> *Kshaya* and *Vridhhi* of other *Dhatu* are dependent on *Rakta Dhatu*.<sup>[16]</sup> Living creatures are endowed with strength, complexion, happiness and longevity due to pure blood. Blood plays a vital role in the sustenance of *Prana*.<sup>[17]</sup>

*Rakta Dhatu* conducts *Prana* to every *Dhatu*, every cell of body. The air inhaled during the process of inspiration becomes vital *Prana* for human body. This *Prana* along with *Rakta Dhatu* is supplied to every organ, tissue and cell to perform physiological activities. *Prana* is an energy without which body will not function. Body cannot survive without *Prana* and *Rakta Dhatu* is medium for the conduction of *Prana*, hence life depends on *Rakta Dhatu*. To support the body and maintain the life is most important function of *Rakta Dhatu*.

Healthy *Rakta Dhatu* maintains the normal colour of skin. Cheerful complexion is a symptom of pure *Rakta Dhatu*. *Rakta Dhatu* circulates in the body and supplies nutrients to tissues. Proper nourishment of *Mamsa Dhatu* depends on proper formation of *Rakta Dhatu*. Proper conduction of *Rakta Dhatu* is responsible for knowledge of touch. *Arundatta*, commentator of *Ashtang Hridaya* described in his commentary that '*Ojovridhikar*' is one of the *Karma* of *Rakta Dhatu*. It increases *Oja* in the body and protects it from different diseases.

### Qualities of Rakta

One who follows the rules and regulation about behaviour in particular *Desha*, in particular *Kala* (season) and adaptation of habits favouring individuality also helps to produce *Shuddha Rakta Dhatu*.<sup>[18]</sup>

Pure blood can be likened to gold purified with fire, *Indragopa*, red lotus, lac, fruit of *Gunja* (*Abrus precatorius*) in colour. These are various shades depending upon individual constitution.<sup>[19]</sup> *Rakta Dhatu* is *Anushnashita Dhatu*. *Rakta Dhatu* is neither very hot nor too cold. It is sweet, unctuous, red in colour, heavy, smells typically. It reacts to substances which affect *Pitta*.<sup>[20]</sup> *Sharangdhara* has told that *Rakta Dhatu* which supports the life is *Snigdha*, *Guru* (heavy), *Chala* and sweet in taste.<sup>[21]</sup>

In *Ashtanga Hridaya*, *Vagbhata* said about *Shuddha Rakta* that it is *Madhura*, *Lavana*, *Sama Shitoshna*, *Asamhata* (Drava), similar to colour of *Padma*, *Indragopa*, *Hema* (Gold) and *Rakta* of *Avi* (Sheep) and *Shasha* (Rabbit).<sup>[22]</sup> *Vridha Vagbhata* also described the same qualities of *Shuddha Rakta*. He told that *Shuddha Rakta* does not stain cloths after washing it. It is similar to qualities of *Pitta* and *Saumya-Agneya* by its nature.<sup>[23]</sup>

**Rakta Pramana:-** *Anjali Pramana* of *Rakta Dhatu* is eight *Anjali*.<sup>[24]</sup>

**Upadhatu of Rakta:-** *Upadhatu* of *Rakta* are *Kandara* (tendons) and *Sira*.<sup>[25]</sup>

**Mala of Rakta:-** The *Mala* of *Rakta* is *Pitta*.<sup>[26]</sup>

#### **Rakta Dhatu Sarata**

Individuals who have *Uttama Rakta Dhatu Sarata* are endowed with following features:- ears, eyes, oral cavity, tongue, palms, soles, nails, forehead, penis; all these organs are of red colour. These organs are very lustrous, glossy. Such individuals are very attractive, handsome. They cannot sustain strenuous job or hot climate. They are endowed with intelligence, happiness and beauty.<sup>[27]</sup>

#### **Rakta Kshaya**

Malnutrition and improper diet cause decrease in *Rakta Dhatu*. *Shonita Kshaya* produces roughness of skin, craving or desire for sour and cold things, looseness of the veins (emptiness of blood vessels).<sup>[28]</sup>

If there is loss of *Rakta Dhatu* due to any reason, there will be *Kshaya* (decrease) of all other *Dhatu* and vitiation of *Vata*.<sup>[29]</sup>

#### **Rakta Vridhi**

Due to over indulgence of oily, pungent food, due to hot climate, *Rakta Dhatu* increases and following symptoms can be seen-Increase of *Rakta* produces red colouration of skin and eyes, engorgement of blood vessels.<sup>[30]</sup> Due to increase in *Rakta Dhatu* *Visarpa*, *Pleeha* *Vidradhi*, *Kushtha*, *Vatarakta*, *Raktapitta*, *Gulma*, *Upakusha*, *Kamla*, *Vyanga*, *Agninasha*, *Sammoha*, red eyes, skin and urine with haemorrhage sometimes happens.<sup>[31]</sup>

#### **Role of Rakta Dhatu in the formation of various organs in intrauterine life**

In the embryonic life, *Rakta Dhatu* plays important role in the formation of *Yakrit* (liver), *Pleeha* (spleen), *Phupphusa* (lungs), *Unduka* (colon), *Vrikka* (kidneys), *Vrishana* (testis) and *Hridaya* (heart).<sup>[32,33]</sup>

#### **Symptoms of Vishuddha Raktawan Purusha**

When *Rakta Dhatu* is in the balanced state, then following features should be seen in person having purest form of *Rakta Dhatu*- cheerful healthy complexion, energetic active sense organs and proper inclination of sense organs towards their subjects, good

digestion, unobstructed natural urges and healthy nourishment of body.<sup>[34]</sup>

#### **DISCUSSION**

According to *Ayurveda*, whatever is taken in the form of food is converted to *Sara* and this *Sarabhaga* is assimilated and produces *Rasa Dhatu*. This *Rasa Dhatu* reaches *Yakrit* and *Pleeha* where *Ranjaka Pitta* acts upon *Rasa* and by *Raktagni Paka* it attains redness and finally forms *Rakta Dhatu*.

As it is one of the seven *Dhatu*, is present in the entire body but *Yakrit*, *Pleeha* and *Raktavahi Dhamani* are special sites of *Rakta Dhatu*. *Rakta Dhatu* brings *Prana* to every *Dhatu*. The air inhaled during the process of inspiration becomes vital *Prana* for human body. This *Prana* by means of *Rakta Dhatu* is supplied to every organ, tissue and cell to perform their respective physiological activities.

*Rakta Dhatu* is the base of living body which maintains life. *Rakta* nourishes the *Mamsa Dhatu*, brings luster to the skin and keeps an individual alive. Cheerful complexion is a symptom of pure *Rakta Dhatu*. *Rakta Dhatu* circulates and supplies nutrients to all tissues. According to *Acharya Sushruta Vata-Pitta-Kapha* are responsible for the creation of living body; fourth entity named *Rakta* is also responsible for the existence, support and maintenance of body. *Acharya Chakrapani* has mentioned that there is variation in color of *Rakta* in individuals is as per their *Prakriti*.

*Acharya Sushruta* mentioned the composition of *Rakta* on the basis of *Pancha Mahabhuta* (five elements) like *Visrata* (*Prithvi Mahabhuta*), *Dravata* (*Jala Mahabhuta*), *Raga* (*Agni Mahabhuta*), *Spandan* (*Vayu Mahabhuta*) and *Laghuta* (*Akasha Mahabhuta*). In the same way based on modern physiology it can be illustrated that *Prithvi Mahabhuta* include serum protein, hemoglobin, glucose etc, *Jala Mahabhuta* include plasma, lipids etc, *Agni Mahabhuta* include potassium, magnesium, iodine, chloride, acid phosphate, lipase, insulin etc, and *Vayu Mahabhuta* includes oxygen, carbon dioxide, vitamin C and thyroxin. As per *Chakrapani* and *Dalhana*, composition of *Rakta Dhatu* is predominantly *Agni* and *Jala Mahabhuta*.

#### **CONCLUSION**

Based on the conceptual study and discussion the following conclusions can be drawn:-

- The tissue systems of the body consist of seven kinds of basic tissues or *Sapta-Dhatu*. One among those is *Rakta*. It is formed by the catalysation of its previous *Dhatu* i.e. *Rasa Dhatu* by the *Raktagni*.
- *Rasa* contributes to the formation of *Rakta* by transporting nutrient substances which are the homologous of *Rakta Dhatu*. These homologous substances get red coloured under the *Ushma* of *Pitta*.

- *Rakta Sthana* means either the site where *Rakta* is formed or stored or both. *Yakrit* and *Pleeha* have been recognised by *Charaka* and *Sushruta* as the *Rakta Sthana*. *Yakrit* and *Pleeha* have also been recognised by these authorities as the *Moola* of *Raktavaha Srotas*.
- *Rakta* nourishes the *Mamsa Dhatu*, brings lustre to the skin and keeps an individual alive. *Rakta Dhatu* 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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