



PHYSIOLOGICAL IMPORTANCE OF RAKTA DHATU: AN AYURVEDIC AND MODERN REVIEW

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ABSTRACT

An example of a *Pranayantan* is *Rakta Dhatu*. Due to its *Panchamahabhuta* composition *Rakta Dhatu* has a unique character. It develops in *Yakruta* and *Phleeha* and is transported throughout the body with *Rasa Dhatu*. The *Rakta Dhatu*, which is found throughout the body, fills the *Dhatu*s and supplies them with nutrients as it passes through the corresponding veins and arteries. Additionally, it improves complexion and feeling of body contact.

According to *Sushruta* and *Charaka*, the primary component of a living body is *Rakta Dhatu*. It is in charge of providing support, promoting *vigor*, complexion, and happiness, providing nutrition to the succeeding *Dhatu*, and ensuring the body's longevity.

KEYWORDS: Rakta Dhatu, Blood, Raktavahasrotas, Dosha,

INTRODUCTION

The oldest system of medicine, *Ayurveda*, serves humanity and places an excessive emphasis on body physiology, making it difficult to comprehend the causes and effects of disease. Pathophysiology of a disease in order to find the most effective cure for the good of humanity. According to *Ayurveda*, the three fundamental building blocks of the body are *Dosha*, *Dhatu*, and *Mala*.¹

Rakta Dhatu is formed by the *Rasa Dhatu*. The *Prasada* portion of the *Rasa Dhatu*, which is watery in colour Pure blood slightly sweet and salty in taste and neither Cold not hot in nature non coagulated (liquid). The colour of the blood resembles red lotus flower, *Indragopa* insect colour, like *Gunjaphal* or blood of sheep & rabbit, it is liquid in nature and *Vishragandha* (*amagandha*), blood is the cause of origin of the body and it determines the condition i.e. healthy or unhealthy state of the body. When it enters to *Yakrit*, *Pleeha*, with the help of *Ranjak Pitta* it turns to red colour and called *Rakta*.²

Alternative names for *Rakta Dhatus* include *Rudhira*, *Asruk*, *Shonit*, *Kshataj*, *Lohit*, and *asru*.³

MATERIALS

The primary sources for this article's information include *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hrudayam*, and several articles, web posts, authentic books, research papers, and courses.

METHODS

Review of literature study.

PANCHABHAUTIKA CONSTITUTION AND PROPERTIES:

Agni Mahabhuta and the other *Mahabhuta* make up the *Rakta Dhatu* in order of dominance. Due to *Prithvi*, *Jala*, *Teja*, *Vayu*, and *Akasha Mahabhuta*, respectively, it has characteristics like an odd odor (*vistrata*), liquidity (*dravata*), a red color (*raga*), pulsation (*Spandanam*), and lightness to get circulated (*laghuta*).⁴

Rakta Dhatu has a distinctive scent (*vistra*), is sweet (*madhura*), unctuous (*snigdha*), crimson (*rakta*), weighty (*guru*), and neither too hot nor too cold (*anushna-sheeta*). The same things that cause *pitta Dosha* can also affect *Vata Dosha*.⁵

LOCATION OF RAKTA DHATU

The *Raktavaha Srotas* are built on the foundations of the liver (*Yakrit*) and spleen (*Pleeha*). According to *Sushruta*, the veins that supply *Rakta* to even the tiniest parts of the body are also the foundation of the *Raktavaha Srotas*. The locations of *Rakta Dhatu's* arrangement and vitiation are the liver and spleen.⁶

LAYER OF BLOOD TISSUE

The layer of the body's outer coverings that may be seen in a sagittal section is called *Kala*. The layer of skin and muscles (*Mamsadhara kala*) is followed by the layer of blood tissue production (*Raktadhara kala*). It is constructed from blood arteries that are linked to the liver and spleen.⁷

CHARACTERISTICS OF PURE BLOOD

Golden red, firefly, red lotus, lac-resinous substance (*laksha*), and the fruit of the *Gunja* (*Abrus precatorius* Linn.) are all examples of the color of pure blood.⁸

FUNCTION AND ACTION OF RAKTA DHATU

Cells are oxygenated by *rakta dhatu*. *Rakta* literally translates to "that which is coloured and red." Blood adds colour in both the literal and symbolic senses. The phrase "*Raktam varna prasaadanam mamsa pushtim jeevayathicha*"⁹

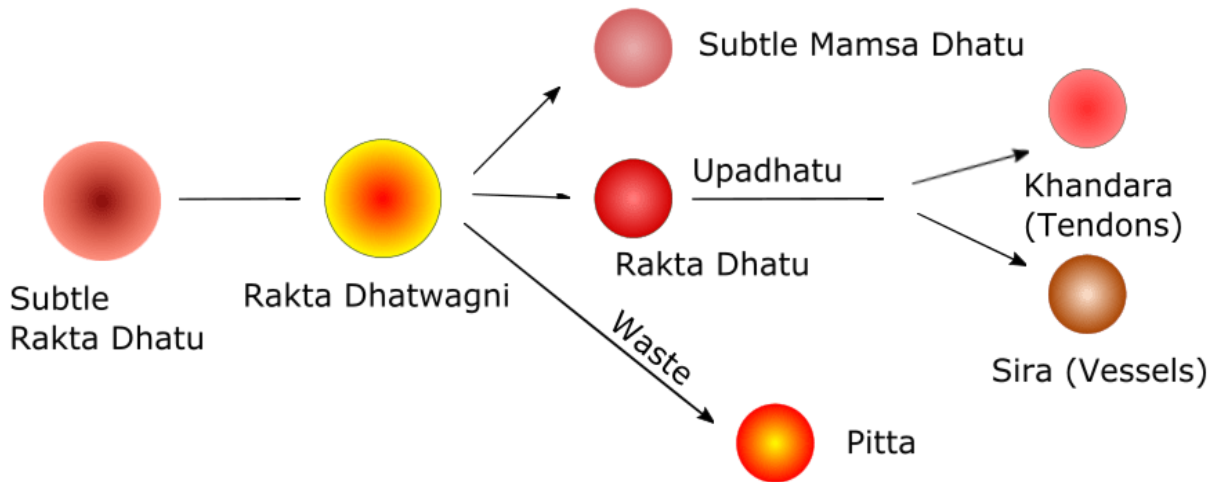
Pure blood gives living things their vigour, complexion, happiness, and lifespan. Blood is essential to the maintenance of *Prana*.¹⁰

Every *Dhatu* and bodily cell receives *Prana* through *Rakta Dhatu*. The air that the human body inhales at the act of inspiration becomes vital *Prana*. Every organ, tissue, and cell receives this *Prana* and *Rakta Dhatu* in order to carry out physiological functions. Without the energy known as *prana*, the body cannot operate. Life is dependent on *Rakta Dhatu* because the body cannot survive without *Prana* and *Rakta Dhatu* is a channel for the conduction of *Prana*. The primary role of *Rakta Dhatu* is to support the body and sustain life.¹¹

RAKTA DHATU SARA

The Sanskrit word *Dhatu-sarta*, which means "excellence of tissue," alludes both Sara's clear-sighted practical viewpoint and the *Dhatu's* superior character. The body of a person stays warm when they are brilliant with *Rakta* (Blood). *Uttama Rakta Dhatu Sarata* patients exhibit the following traits: reddish ears, eyes, oral pits, tongues, hands, soles, eyebrows, and penises. There is an amazing luster to these organs. Such people are attractive and beautiful. They are unable to handle a hot climate or hard job. They receive wisdom, joy, and magnificence.¹²

FORMATION OF RAKTA DHATU AND UPA DHATU



Following processing with *Rakta Dhatwagni*, the more subtle form of *Rakta Dhatu* yields more subtle *Mamsa Dhatu*, *pitta* as waste, and stable *Rakta Dhatu*. Tendons (*khandara*) and blood vessels (*Siras*) are also created as *Upadhatu*s during this process.¹³

METABOLISM OF RAKTA DHATU

Formation of *Poshaka Rakta Dhatu* takes place in the *Raktavaha srotas*. Nutritive part homologues to *Rakta Dhatu* is converted to *Rakta Dhatu* in the *Raktavaha Srotas*. According to *Charaka*, *Rasa Dhatu* is colorless & consists of nutrients of seven *Dhatu*s. Liquid white colored *Rasa* when enters *Raktavaha Srotas* - liver & spleen - gets red colour due to action *Ranjaka Pitta*.

In *Sushruta Samhita*, *Ranjaka pitta* is described as *Ranjaka agni*. According to *Sushruta*, *Agni* & *Pitta Dosha* are same so he has used the term *Agni* to five types of *pitta Dosha*. Hence role of *Ranjaka pitta* & *Rakta Dhatvagni* is same.

Under the influence of *Rakta Dhatvagni*, *Rakta Dhatu* is formed in the *Raktavaha srotas*. According to *Kshira-dadhi nyaya*, *Rakta Dhatu* is formed after *Rasa Dhatu*, while according to

Kedara-kulya nyaya, *Rakta Dhatu* is formed in the *Raktavaha srotas* after 5 days from ingestion of food.¹⁴

DISORDER OF RAKTA DHATU

Rakta vridhhi- due to an excessive intake of savory, pungent foods, related to heat climate, *Rakta Dhatu* grows, and the subsequent signs and symptoms of *Rakta Dhatu* rises can be observed: Skin and eye redness, as well as blood vessel swelling.

Rakta kshaya- Lack of nourishment and a poor diet result in *Rakta* deficiency. The symptoms include collapsing veins and a craving for sour, cold food signs of lowered *Rakta Dhatu*. *Vata* is the result of decreased *Rakta Dhatu*. Hankingering for *Vata Dosha* is reduced by sour meals.¹⁵

DISORDER DUE TO BLOOD VITIATION

Stomatitis, erysipelas, bleeding disorder, drowsiness, abscess, haematuria, menorrhagia, *vatarakta*, discoloration of skin, loss of digestive power, thirst, heaviness in body, pyrexia, extreme debility, anorexia, headache, burning sensation after meals, bitter and sour eructation, physical and mental exhaustion, excessive anger, state of confusion, Itching, pustules, patches, boils, leprosy, thick skin, sweating, fetid body odor, narcosis, tremors, diminished voice, sleepiness, excessive sleep, and a sense of gloom, among other symptoms. The disorders that, despite being treatable, do not improve after being treated with one of the six therapies—cold-hot, unctuous-rough, etc. should be regarded as being brought on by impure blood.¹⁶

PHYSIOLOGICAL ASPECT OF BLOOD

ACID BASE BALANCE: The physiological pH of the human body is essential for many processes necessary to life including oxygen delivery to tissues, correct protein structure, and innumerable biochemical reactions that rely on the normal pH to be in equilibrium and complete.

RESPIRATORY FUNCTION: Respiration is a reflex process. But it can be controlled voluntarily for a short period of about 40 seconds. However, by practice, breathing can be withheld for a long period. At the end of that period, the person is forced to breathe. Respiration is subjected to variation, even under normal physiological conditions. For example, emotion and exercise increase the rate and force of respiration. But the altered pattern of respiration is brought back to normal, within a short time by some regulatory mechanisms in the body. Normally, quiet regular breathing occurs because of two regulatory mechanisms: 1. Nervous or neural mechanism 2. Chemical mechanism. Transport of respiratory gases is carried by blood.

NUTRITIVE FUNCTION: The digestive system absorbs nutrients like glucose, amino acids, lipids, and vitamins that are then transported by blood to various regions of the body for development and energy production.

FUNCTION OF HARMONES AND ENZYMES: Direct release into the circulation occurs when ductless (endocrine) glands emit hormones. These hormones are carried to their intended organs and tissues via the circulation. Enzymes are also transported via blood.

STORAGE FUNCTION: The tissues are continually in need of water and several essential molecules like proteins, carbohydrates, salt, and potassium. These chemicals have a ready-made source in blood. Additionally, when situations like famine, fluid loss, electrolyte loss, etc., these chemicals are drawn from the circulation.

PROTECTIVE FUNCTION: Blood is crucial to the body's defense mechanism. This activity is carried out by the white blood cells. By phagocytosis, neutrophils and monocytes ingest the bacterium. Immunity is developed in part by lymphocytes. Eosinophils are in charge of breaking down, eliminating, and detoxifying foreign proteins.

BODY TEMPERATURE REGULATION: Blood's high specific heat makes it essential for maintaining the body's thermoregulatory system, which regulates the balance between heat gain and loss.

REGULATION OF WATER BALANCE:

Blood's water content can be readily swapped out for interstitial fluid. This aids with water regulation.

REGULATION OF EXCRETORY SYSTEM: Blood removes waste materials created in the tissues during various metabolic processes and transports them to the excretory organs, such as the kidney, skin, and liver, for excretion.¹⁷

FUNCTION OF RED BLOOD CELLS:

- 1. TRANSPORT OF OXYGEN FROM THE LUNGS TO THE TISSUES-** Hemoglobin in RBC combines with oxygen to form Oxyhemoglobin. About 97% of oxygen is transported in blood in the form of Oxyhemoglobin
- 2. BUFFERING ACTION IN BLOOD-** Hemoglobin serves as an effective buffer. By doing so, it controls the hydrogen ion concentration and contributes to the preservation of the acid-base balance.
- 3. BLOOD GROUP DETERMINATION-** Blood group antigens including the A antigen, B antigen, and Rh factor are carried by RBCs. This aids in blood group identification and helps to avoid adverse responses from blood transfusions.
- 4. TRANSPORT OF CARBON DIOXIDE FROM THE TISSUES TO THE LUNGS-** The carbonic anhydrase is present in high concentrations in RBCs. This enzyme is required for the conversion of water and carbon dioxide into bicarbonate. Consequently, it aids in moving carbon dioxide in the bicarbonate from the tissues to the lungs. Roughly 63% of This type of carbon dioxide is transferred.¹⁸

DISCUSSION

Rakta Dhatu is crucial for maintaining life. Thus, it is necessary to take all necessary precautions to protect this *Dhatu*. According to *Dalhana*, because *Rakta* is crucial to life, *Sushruta* had to focus on *Rakta Dhatu* due of his training as a physician. *Rakta* is equally crucial for the development and maintenance of *Garbha*, along with *Vata*, *Pitta*, and *Kapha*. *Doshas* determine the different varieties of *Prakriti*; *Rakta* does not cause *Prakriti* to form.

Rakta Dhatwagni uses *Rasa Dhatu's Poshakamsha* in the *Raktavaha Srotas* to create *Rakta*. While *Rakta* by itself cannot vitiate other body structures, *Rakta* in combination with other *Doshas* can. The foundation of the living organism, *Rakta Dhatu*, sustains life. *Rakta* gives the *Mamsa Dhatu* nourishment, enhances the appearance of the skin, and sustains life. Cheerful an indication of pure *Rakta Dhatu* is one's complexion. *Rakta* All tissues receive nutrition from the *Dhatu*, which circulates. *Vata-Pitta-Kapha*, in accordance with *Acharya Sushruta*, are fourth entity that is in charge of creating living beings the existence is also due to a person by the name of *Rakta*. Body upkeep and support. *Chakrapani Acharya* has noted that *Rakta's* color might vary depending on the People are according to their *Prakriti*.

CONCLUSION

Rakta and *Tridosha* are equally important for maintaining the body. One of the *Pranayatana* (vital spots) is thought to as being there. With the aid of *Vyanavata* and *Rakta dahara Kala*, *Rakta* travels throughout the body. Color complexion, *Mamsapusti*, and *Jeevana* (presence of life) are three of the *Rakta's* regular physiological functions. *Raktaja vikara* should be used to treat illnesses that *Shadupakrama Chikitsa* is unable to cure.

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