WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 3, 1911-1924. Review Article ISSN 2277–7105

A CONCEPTUAL STUDY OF *RAKTA DHATU* AND *RAKTAVAHA SROTAS* WITH SPECIAL REFERENCE TO *KAMALA*

Dr. Suryakanth V. Ghule[1] M.D(Ayu), Dr. Nanda V. Kuri*[2]

[1]Professor, Department of *Rachana Shareera,* Government ayurveda medical college Dhanvantari Road, Bengaluru, Karnataka 560009.

[2]Postgraduate Scholar, Department of *Rachana Shareera*. Government Ayurveda Medical College Dhanvantari Road, Bengaluru, Karnataka 560009.

Article Received on 05 Jan. 2026,
Article Revised on 25 Jan. 2026,
Article Published on 04 Feb. 2026

https://doi.org/10.5281/zenodo.18481724

***Corresponding Author**

Dr. Nanda V. Kuri

Postgraduate Scholar, Department of Rachana Shareera. Government Ayurveda Medical College Dhanvantari Road, Bengaluru, Karnataka 560009.

How to cite this Article: Dr. Suryakanth V. Ghule[1], M.D(Ayu), Dr. Nanda V. Kuri*[2]. (2026). A Conceptual Study of Rakta Dhatu And Raktavaha Srotas with Special Reference To Kamala. World Journal of Pharmaceutical Research, 15(3), 1911–1924.

ABSTRACT

Rakta dhātu is one of the most important among the *sapta dhātus* described in Ayurveda responsible for the sustenance of life, nourishment of tissues, and maintenance of normal complexion. The proper functioning of *rakta dhātu* depends upon the integrity of *raktavaha srotas*, whose *mūlasthāna* are *yakrit* and *plīhā*. Any vitiation of *rakta dhātu* or obstruction of *raktavaha Srotas* leads to various pathological conditions collectively known as *raktapradoshaja vyādhis*, among which *kamala* is a prominent disorder. *kamala* is predominantly caused by *pitta doṣa* vitiation and is characterized by yellowish discoloration of skin, eyes, urine, and other systemic features. This conceptual study aims to elaborate the fundamental principles of *rakta dhātu* and *raktavaha Srotas* and to analyse their role in the etiopathogenesis of *kamala*. Classical Ayurvedic texts including Charaka saṁhitā, Suśruta saṁhitā, and Aṣṭāṅga hṛdaya were reviewed to understand the interrelationship between *rakta, pitta*, and *raktavaha Srotas* in the manifestaion of *kamala.*

KEYWORDS: *Rakta dhatu, Raktavaha srotas, Kamala,* Jaundice.

INTRODUCTION

Nirukti[1]

"रज्यत अङ्गमनेनेति"

The term *Rakta* is derived from the expression "*Rajyat aṅgam anena iti*," meaning that which imparts red colour to the body and its organs.

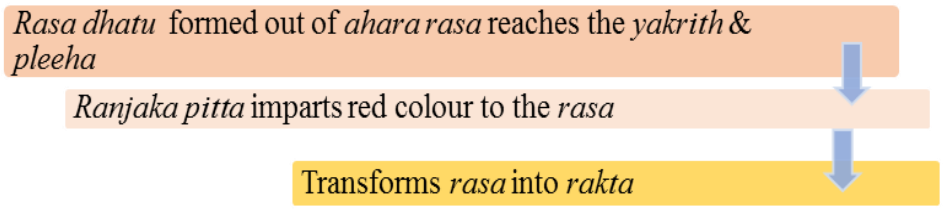
Vyutpatti (Derivation)[2]

- *Rañj + Kta = Rakta*
- That which possesses the property of *rañjana* (colouring).

Synonyms[3]

Rudhira, asrik, lohita, asra, kshataja, shonita.

Formation of *rakta dhatu*[4]



Panchamahabhoota predominance[5]

Rakta Dhātu shows a predominance of ***Agni (Tejas) and Jala***, with contributions from the other *Mahābhūtas.*

Mahabhoota	***Sartha guna***	***Guna of rakta***
Prithvi	*Gandha*	*Visrata*
Jala	*Rasa*	*Dravata*
Agni	*Rupa*	*Raaga*
Vayu	*Sparsha*	*Spandana*
Akasha	*Shabdha*	*Laghuta*

Pramana of *rakta*[6]

The normal quantity of *rakta dhātu* in a healthy adult is ***8 Anjali.***

Upadhatu of *rakta*

	Charaka[7], Sushruta& Vagbhata	Sharangadara[8]
Upadhatu	*Khandara & Sira*	*Arthava*

***Mala* of *rakta*[9]**- the *mala* of *rakta* is *pitta.*

Shuddha rakta lakshana

तपनीयेन्द्रगोपाभं पद्मालक्तकसन्निभम्|

गुञ्जाफलसवर्णं च विशुद्धं विद्धि शोणितम्||(Cha.su.24/22)

Shuddha rakta resembles the colour of red hot *Swarna* and *indragopa* (velvet mite or red coloured insect) lotus and *aalaktaka* (a vibrant red dye or juice, typically from lac produced by insects on trees) *gunja phala* (*Abrus precatorius*).

इन्द्रगोपकप्रतीकाशमसंहतमविवर्णं च प्रकृतिस्थं जानीयात् ||(Su.su.14/22)

Indragopa - Red coloured mite.

Asamhata - *Na ati accha* -not too thin

Na ati ghana – not too thick

Na sthyayati atyanta – not clots excessively

Avivarnam – resembles the colour of *indragopa*, *padma* or *alaktha* other than these can be considerd as abnormal and should not leave any stain on the cloth after washing.

Sthana of shonita[10]: - *yakrith* and *pleeha* are considerd as the *sthana* of *shonita.*

Swalakshana* of *shonita[11]

- *Anushana sheeta*
- *Madhura rasa*
- *Snigdha, guru guna*
- *Rakta varna*
- *Visra gandha*

Prakruta karma* of *rakta[12]

- *Varna prasadana* (brightens the skin)
- *Mamsapushti* (nourishes the *mamsa dhatu*)
- *Jeevayati* (supports the life)

Rakta* is one among the *Dasha pranayatana[13]

दशैवायतनान्याहुः प्राणा येषु प्रतिष्ठिताः|

शङ्खौ मर्मत्रयं कण्ठो रक्तं शुक्रौजसी गुदम्||

Rakta is considerd as one among the *dasha paranayatana* which means any *upaghata* to these leads to the *praana upaghata*, distruction of these results in the *prana nasha*.

Rakta vruddhi lakshana

Sushruta[14]
• *Raktanga*
• *Rakta Akshi*
• *Sirapurnata*

Ashtanga hrudaya[15]	
• *Visarpa*	• ***Kamala***
• *Pleeha*	• *Vyanga*
• *Vidradhi*	• *Agninasha*
• *Kushta*	• *Sammoha*
• *Vatarakta*	• *Rakta tvak*
• *Gulma*	• *Raktamutrata*
• *Upakusha*	• *Rakta netra*

Rakta kshaya lakshana

Charaka[16]
• *Parusha twak*
• *Sputita twak*
• *Mlanata*
• *Rukshata*

Sushruta[17]
• *Amla preeti*
• *Shishira Preeti*
• *Sirashaitilya*
• *Rukshata*

Vagbhata[18]
• *Tvak parushya*
• *Amla Prarthana*
• *Sheeta Prarthana*
• *Sira shaitil*ya

Rakta dhatu saara pusrusha lakshana[19]

The Person who has *uttama rakta dhatu saaarata* will have red coloured ears, eyes oral cavity, tongue, nose, lips, palms, soles, nails, forehead, penis. These organs have shiny and lustrous appearance and possesses beauty, enjoyment and knowledge.

Raktavaha srotas moolasthana[20]

Yakrith and *pleeha* are considerd as the *moolasthan* of *raktavaha srotas* by all the *brihatrayees.* Sushruta includes *rakta vahaini dhamani.*

Rakta as the chaturtha dosha[21]

Acharya Sushruta considered *rakta a*s the *chaturtha dosha* in his *sutrasthana* 21st chapter

Importance of rakta dhatu[22]

देहस्य रुधिरं मूलं रुधिरेणैव धार्यते |

तस्माद्यत्नेन संरक्ष्यं रक्तं जीव इति स्थितिः ||(Su.su.14/44)

The sustenance of the body is entirely dependent upon Rakta. It is further stated that Rakta should be protected with utmost care, as it is synonymous with life itself (*"raktam jīvam iti sthitiḥ"*) any quantitative or qualitative derangement of Rakta leads to serious pathological conditions. Therefore, preservation of Rakta through proper diet, lifestyle, and therapeutic measures is considered essential in Ayurveda for the maintenance of health and prevention of disease.

Yakrut

- Colour: *kaalakhanda (krishna varna)*[23]
- Location: situated below and to the right of *Hridaya.*
- Development: formed from the *prasada bhaaga* of *rakta.*
- Classification: considerd as the *koshtanga* by acharya Charaka, Bhela, Vagbhata and Kashyapa not considerd by Sushruta.

Pleeha

- Location: situated below and to the left of *Hridaya*[24]
- Development: formed from the *prasada bhaaga* of *rakta*.
- Classification: considerd as the *koshtanga* by acharya Charaka, Bhela, Vagbhata and Kashyapa.

Raktavaha sroto dushti karana[25]

Excessive intake of *vidahi ahara, Snigdha, ush*na and *drava ahara*, excessive exposure to sunlight these all *nidana* will leads to the vitiation of *raktavaha srotas.*

Rakta pradoshaja vikara[26]

Vikara	Charaka samhita	Sushruta samhita	Bhela samhita
Mashaka	-	+	-
Nyaccha	-	+	-
Indralupta	-	+	-
Vatarakta	-	+	-
Arsha	-	+	-
Arbuda	-	+	-
Angamarda	-	+	-
Kacchu	-	-	+
Vicharchika	-	-	+
Kushta	+	+	+
Visarpa	+	+	-
Pidaka	+	+	-
Raktapitta	+	+	-
Asrikdara	+	+	-
Gudapaka	+	-	-
Medrapaka	+	-	-
Aasyapaka	+	-	-
Pleeha	+	+	-
Gulma	+	-	-
Vidradhi	+	+	-
Neelika	+	-	-
Kaamala	+	-	-

Vyanga	+	+	-
Piplu	+	-	-
Tilakalaka	+	+	-
Dadru	+	-	-
Charmadala	+	-	+
Paama	+	-	+
Kotha	+	-	-
Asramandala	+	-	-

Sroto viddha lakshana[27]

Whenever there is an injury to the *moola* of *raktavaha srotas* it presents with the Shyavangata -bluish black discolouration of skin, *jwara*(fever), *daha*(burning sensation), *panduta*(pallor), *shonitagamana* (bleeding), *rakta netrata*(reddish discolouration of eyes).

Chikitsasutra[28]**:** *Virechana, Upavasa, Raktamokshana.*

Kaamala

पाण्डुरोगी तु योऽत्यर्थं पित्तलानि निषेवते|

तस्य पित्तमसृग्मांसं दग्ध्वा रोगाय कल्पते|(Cha.chi.16/35)

Kamala is the *nidanarthakara vyadhi* of *pandu*, whenever the *pandu rogi* consumes excessive *pittakaraka ahara* the aggravated *pitta* vitiates the *rakta* and *mamsa* leading to the manifestation of *kamala.*

Nidana[29]

- *Bahupitta kamala / koshtashakhashrita kamala/ bahupitta kamala*

Aharaja	***Viharaja***	***Manasika***
Excessive *kshara, amla, lavana sevana*	*Ativyayama*	*Kama*
Viruddha ahara	*Atimaituna*	*chinta*
Vidagdha anna	*Diwaswapna*	*bhaya*
Asatmya bhojana	*Vegadharana*	*Krodha*
Nishapava, masha, pinyaka, tila taila		*Upahata cheshta*

- *Ruddhapata kamala/ shakhashrita kamala/ alpa pitta kamala*

Aharaja	***Viaharaja***
Excessive intake of *ruksha ahara*	*Ativyayama*
Sheeta, guru, madhura rasa ahara	*Vegadharana*

Samprapti ghataka

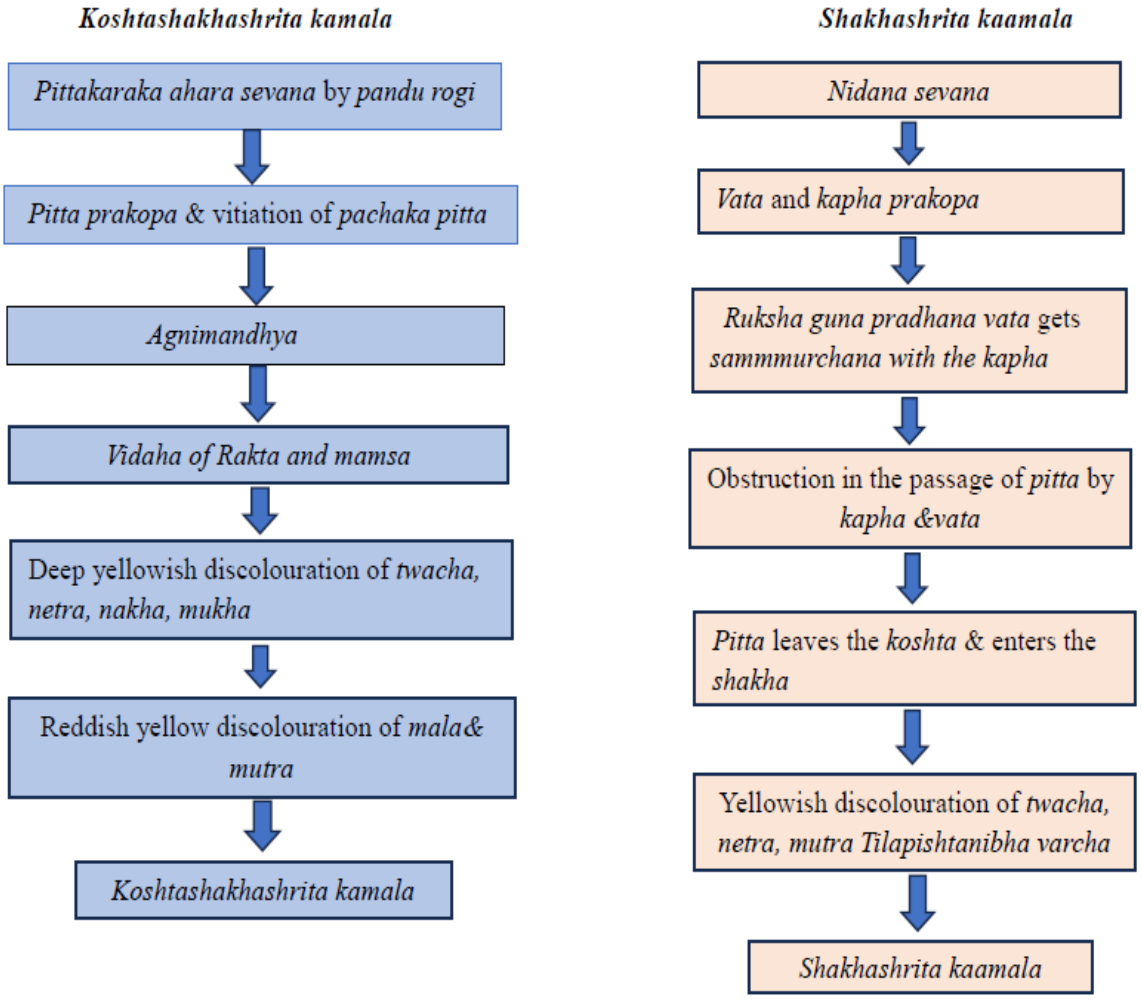
- *Dosha*: *Pitta – Ranjaka pitta, Bhrajaka pitta, Pachaka pitta.*

Vata- Vyana vata, samana vata.

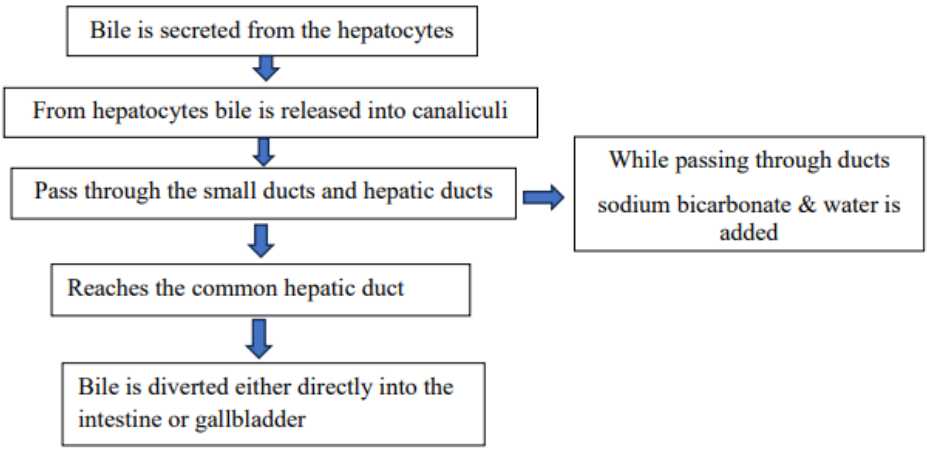
Kapha – Kledaka kapha.

- *Dushya: Dhatu-rasa, rakta, mamsa.*
- *Agni: Jataragni mandhya, dhatvagni, bhootagni.*
- *Srotas – rasavaha, raktavaha, annavaha srotas.*
- *Srotodushti –sanga, vimarga gamana.*
- *Udbhava sthana -amashaya.*
- *Vyakta sthana-twak, netra, nakha, anana, koshta, shakha.*

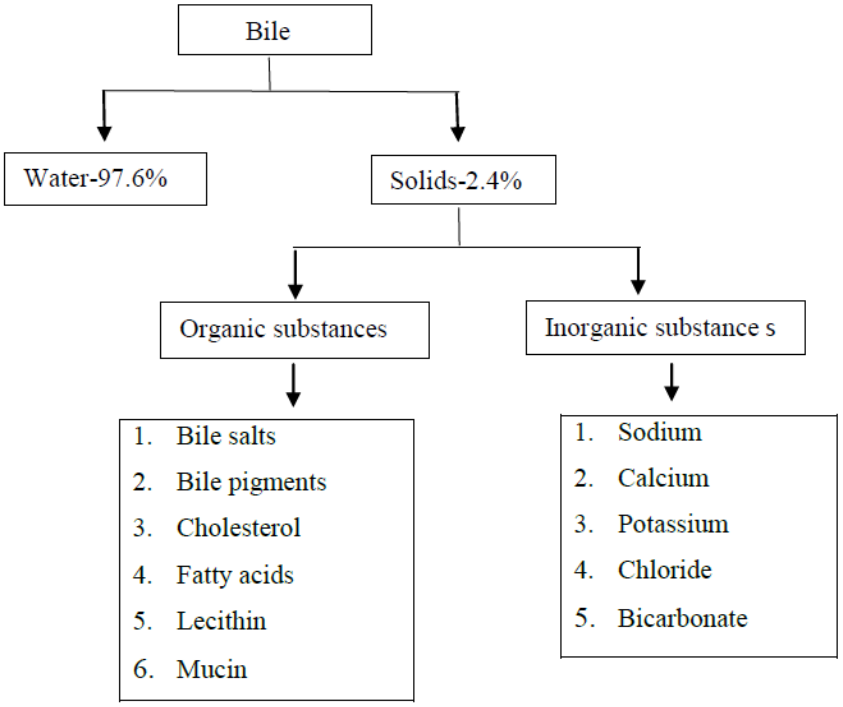
***Samprapti*[30]**



Physiological aspects of bile secretion[31]



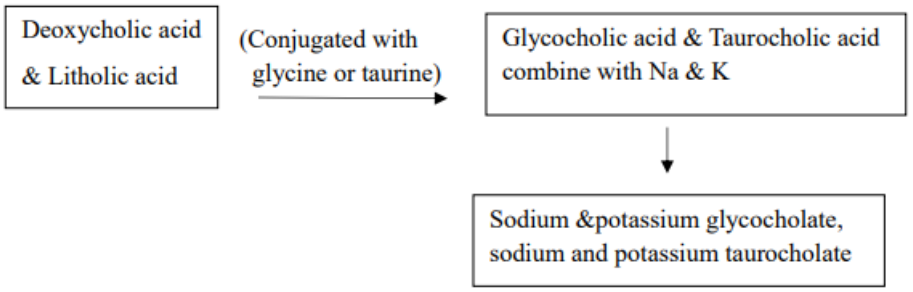
Composition of bile[32]



Formation of bile salts[33]

- Bile salts are formed from the bile acids.
- Two primary bile acids in human - Cholic acid & Chenodeoxycholic acid.
- These bile acids are formed in the liver and enter the intestine through the bile.
- Due to the bacterial action in the intestines the primary bile acids are converted into secondary bile acids Cholic acid ⟶ Deoxycholic acid
  Chenodeoxycholic acid ⟶Litholic acid.

- Secondary bile acids from intestine are transported back to liver through enterohepatic circulation.
- In the liver secondary bile acids are conjugated with glycine or taurine and form conjugated bile acids.



Bile pigments[34]

- Bile pigments are the excretory products of bile.
- bilirubin and biliverdin are the two bile pigments and bilirubin are the major bile pigment in the humans.
- Bile pigments are formed during the breakdown of haemoglobin, which is released from the destroyed RBCs in the reticuloendothelial system.

Formation and excretion of bile pigments

Stages of formation and circulation of bile pigments:

1. Senile erythrocytes are destroyed in reticuloendothelial system and haemoglobin is released from them.
2. Haemoglobin is broken into globin and haem.
3. Haem is split into iron and the pigment biliverdin.
4. Iron goes to iron pool and is reused.
5. First formed pigment biliverdin is reduced to bilirubin.
6. Bilirubin is released into blood from the reticuloendothelial cells.
7. In blood, the bilirubin is transported by the plasma protein, albumin. Bilirubin circulating in the blood is called free bilirubin or unconjugated bilirubin.
8. Within few hours after entering the circulation, the free bilirubin is taken up by the liver cells.
9. In the liver, it is conjugated with glucuronic acid to form conjugated bilirubin.
10. Conjugated bilirubin is then excreted into intestine through bile.

Fate of conjugated bilirubin

Stages of excretion of conjugated bilirubin:

1. In intestine, 50% of the conjugated bilirubin is converted into urobilinogen by intestinal bacteria. First the conjugated bilirubin is deconjugated into free bilirubin, which is later reduced into urobilinogen.
2. Remaining 50% of conjugated bilirubin from intestine is absorbed into blood and enters the liver through portal vein (enterohepatic circulation). From liver, it is re-excreted in bile.
3. Most of the urobilinogen from intestine enters liver via enterohepatic circulation. Later, it is re-excreted through bile.
4. About 5% of urobilinogen is excreted by kidney through urine. In urine, due to exposure to air, the urobilinogen is converted into urobilin by oxidation.
5. Some of the urobilinogen is excreted in feces as stercobilinogen. In feces, stercobilinogen is oxidized to stercobilin.

Normal plasma levels of bilirubin

Normal bilirubin (Total bilirubin) content in plasma is 0.5 to 1.5 mg/dL. When it exceeds 1 mg/dL, the condition is called hyperbilirubinemia. When it exceeds 2 mg/dL, jaundice occurs.

Jaundice or icterus[35]

Jaundice or icterus is the condition characterized by yellow coloration of the skin, mucous membrane and deeper tissues due to increased bilirubin level in blood.

The word jaundice is derived from the French word *'jaune'* meaning yellow.

The normal serum bilirubin level is 0.5 to 1.5 mg/dL. Jaundice occurs when bilirubin level exceeds 2 mg/dL.

Types of Jaundice; Jaundice is classified into three types:

1. Prehepatic or hemolytic jaundice
2. Hepatic or hepatocellular jaundice
3. Posthepatic or obstructive jaundice.

1. Prehepatic or Haemolytic Jaundice

Haemolytic jaundice is the type of jaundice that occurs because of excessive destruction of RBCs resulting in increase of excessive free unconjugated bilirubin. In this condition, the

excretory function of liver is normal. But the quantity of bilirubin increases rapidly. Unconjugated bilirubin is insoluble in water and is not excreted in urine. So, it accumulates in the blood and tissues.

2. Hepatic or Hepatocellular or Cholestatic Jaundice

Hepatic jaundice is the type of jaundice that occurs due to the damage of hepatic cells. Because of the damage, the conjugated bilirubin from liver cannot be excreted and it returns to blood.

3. Posthepatic or Obstructive or Extrahepatic Jaundice

Posthepatic type of jaundice occurs because of the obstruction of bile flow at any level of the biliary system. The bile cannot be excreted into small intestine So, bile salts and bile pigments enter the circulation. The blood contains more amount of conjugated bilirubin.

DISCUSSION

Rakta dhātu is considered one of the most vital *dhātus* in Ayurveda, as it sustains life by nourishing the body and maintaining normal complexion, strength, and vitality. Classical texts describe *rakta* as *Jīvana*, *Varṇa-prasādana*, and *Prāṇa-dhāraṇa*, highlighting its close association with life processes. Any derangement in *rakta dhātu* directly affects systemic health and manifests as various disorders, among which *kamala* is an important clinical condition.

Raktavaha srotas, having *yakṛut* (liver) and *plīha* (spleen) as its *mūlasthāna*, plays a central role in the formation, circulation, and maintenance of *rakta dhātu*. The involvement of *yakṛut* establishes a strong anatomical and physiological correlation between Ayurvedic concepts and the modern understanding of hepatic function, especially in metabolism and bilirubin handling. *Dushti* of *raktavaha srotas* leads to improper formation, circulation, or purification of *rakta dhātu*, thereby initiating pathological changes.

Kamala is described as a disease characterized by *peeta* varṇa of *netra*, *tvak*, and *nakha*, which closely resembles jaundice described in modern medicine. Ayurveda considers *kamala* primarily as a *pittaja nanātmaja vyādhi*, where aggravated *pitta* vitiates *rakta dhātu* due to their *ashraya-ashrayī bhāva*. Excessive intake of *pitta* provoking factors such as *tikṣṇa, uṣṇa, amla, and lavaṇa ahāra*, along with alcohol consumption and chronic diseases, results in *rakta dushti* and *raktavaha srotodushti*.

From a pathophysiological perspective, *Kamala* can be correlated with Hyperbilirubinemia. Impairment of *yakṛut* leads to improper metabolism and excretion of bile pigments, causing accumulation of bilirubin in blood. This concept parallels the Ayurvedic description of *mala sanchaya* in *rakta dhātu*, resulting in discoloration and systemic manifestations. The classification of *kamala* into *koshṭhaśrita* and *sākhāśrita kamala* further supports this correlation, resembling hepatocellular and obstructive jaundice respectively.

In *raktavaha srotodushti lakṣhaṇas* such as *pāṇḍutā, haridra netra, daurbalya, aruchi,* and *peeta mutra* are commonly observed, which are also classical features of *kamala*. This highlights that *kamala* is not merely a localized hepatic disorder but a systemic manifestation of *rakta dhātu* vitiation. Thus, *rakta dushti* forms the fundamental pathological basis of *kamala*.

The discussion emphasizes that understanding *kamala* through the framework of *rakta dhātu* and *raktavaha srotas* provides a holistic view of disease pathogenesis. This conceptual approach aids in planning effective Ayurvedic management strategies such as *pittahara*, *raktashodhana*, and *yakṛut-uttejaka* therapies, thereby reinforcing the relevance of classical Ayurvedic principles in contemporary clinical practice.

CONCLUSION

Rakta dhātu plays a pivotal role in maintaining normal physiology and vitality of the body, and its proper formation and circulation are dependent on the integrity of *raktavaha srotas*. *yakṛut*, being the *mūlasthāna* of *raktavaha Srotas*, holds a central position in the pathogenesis of *rakta*-related disorders. *Kamala* represents a classical example of *rakta dhātu* dushti and *raktavaha srotodushti*, predominantly caused by *pitta* vitiation.

The clinical features of *kamala* such as *peeta varṇatā* of *netra*, *tvak*, and *mutra* can be clearly understood as manifestations of *rakta dushti* and impaired *raktavaha srotas* function. The Ayurvedic description of *kamala* shows close resemblance to jaundice described in modern medicine, especially in terms of bilirubin metabolism and hepatic dysfunction. This conceptual correlation validates the scientific relevance of Ayurvedic principles.

Understanding *kamala* through the framework of *rakta dhātu* and *raktavaha srotas* provides a holistic perspective of disease pathology rather than an organ-specific view. Such an approach helps in rational planning of treatment modalities aimed at *pitta shamana*, *rakta*

shodhana, and restoration of *yakṛut* function. Thus, the present conceptual study reinforces the importance of classical Ayurvedic concepts in explaining, diagnosing, and managing Kamala in contemporary clinical practice.

REFERENCE

1. Raja Radha Kanta Deva. *Shabda-Kalpadrumah: an encyclopaedic dictionary of Sanskrit words*. Part 4. 3rd ed. Varanasi: Chowkhamba Sanskrit Series Office, 2024; 69.
2. Raja Radha Kanta Deva. *Shabda-Kalpadrumah: an encyclopaedic dictionary of Sanskrit words*. Part 4. 3rd ed. Varanasi: Chowkhamba Sanskrit Series Office, 2024; 69.
3. Raja Radha Kanta Deva. *Shabda-Kalpadrumah: an encyclopaedic dictionary of Sanskrit words*. Part 4. 3rd ed. Varanasi: Chowkhamba Sanskrit Series Office, 2024.
4. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 60.
5. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 59 & 60.
6. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani. Reprinted ed. Varanasi: Chaukhambha Orientalia; Shareerasthana, 339.
7. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani. Reprinted ed. Varanasi: Chaukhambha Orientalia; Chikitsasthana, 514.
8. Shastri P. *Sharangadhara Samhita*. 3rd ed. Varanasi: Chaukhambha Orientalia; 1983. Pradhama Khanda, Adhamalla.
9. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani. Reprinted ed. Varanasi: Chaukhambha Orientalia; Chikitsasthana, 515.
10. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 102.
11. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 102.
12. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 67.

13. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani. Reprinted ed. Varanasi: Chaukhambha Orientalia; Sutrasthana, 181.
14. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 70.
15. Hari Sadasiv Sastri Paradakara, editor. *Ashtanga Hrudayam* of Vagbhata with Sarvanga Sundara of Arunadatta & Ayurvedarasayana of Hemadri. Varanasi: Chaukhambha Surbharati Prakashan, 2022; Sutrasthana, 184.
16. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Sutrasthana, 103.
17. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 69.
18. Hari Sadasiv Sastri Paradakara, editor. *Ashtanga Hrudayam* of Vagbhata with Sarvanga Sundara of Arunadatta & Ayurvedarasayana of Hemadri. Varanasi: Chaukhambha Surbharati Prakashan, 2022; 185.
19. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Vimanasthana, 278.
20. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Shareera sthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 386.
21. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 99.
22. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Sutrasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 66.
23. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Shareerasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 358.

24. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Shareerasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 358.
25. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Vimanasthana, 251.
26. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Sutrasthana, 179.
27. Acharya Yadavji Trikamji, editor. *Sushruta Samhita* with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Shareerasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2019; 386.
28. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Sutrasthana, 125.
29. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Chikitsa sthana, 527&532.
30. Acharya Yadavji Trikamji, editor. *Charaka Samhita* with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia; Chikitsa sthana, 532.
31. Sembulingam K, Sembulingam P. *Essentials of medical physiology*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd., 2019; 251.
32. Sembulingam K, Sembulingam P. *Essentials of medical physiology*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd., 2019; 252.
33. Sembulingam K, Sembulingam P. *Essentials of medical physiology*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd., 2019; 252.
34. Sembulingam K, Sembulingam P. *Essentials of medical physiology*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd., 2019; 253.
35. Sembulingam K, Sembulingam P. *Essentials of medical physiology*. 6th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd., 2019; 258.