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Research Article

Conceptual Study of *Raktavaha Strotas* W.R.T. Erythropoiesis: A Review

Dr. Utkarsh Sharma [1*], Dr. Manu Sharma [2]

[1] Department of Post Graduate Studies in Kriya Sharir, Jammu Institute of Ayurveda and Research, Jammu, Jammu and Kashmir, India

[2] Vice Principal and Professor, Department of Post Graduate Studies in Kriya Sharir Jammu Institute of Ayurveda and Research, Jammu, Jammu and Kashmir, India

Corresponding Author: * Dr. Utkarsh Sharma

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Abstract

Background: Ayurveda, as an ancient science of life, prioritises the maintenance of a healthy baseline state over mere disease management. This structural and functional health is governed by the Srotas (channel) system, which is highly prone to losing its metabolic integrity due to an erratic lifestyle and faulty dietary habits. Within this framework, the Raktavaha Srotas is responsible for transporting blood cells and haemoglobin to fulfil the vital functional role of Jeevana (the absolute sustenance of life).

Aim & Objective: This conceptual review aims to explore the traditional literary perspectives of Raktavaha Srotas, analyse the contemporary physiological principles of erythropoiesis, and harmonise the two domains by evaluating the specific logistical and regulatory actions of the Yakrut (liver) and Pleeha (spleen).

Methodology: The research follows a conceptual review methodology, collecting and synthesizing classical textual references from the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya, alongside scientific clinical insights from standard modern textbooks of medical physiology and haematology.

Results & Discussion: Ayurveda evaluates blood formation not as an isolated localized event within the bones, but as a sequential, multi-stage metabolic transformation moving from Ahara Rasa to Rasa Dhatu and ultimately to Rakta Dhatu, heavily driven by Jatharagni, Ranjaka Pitta, and Raktadhatvagni. While modern medicine isolates standard adult erythropoiesis structurally to the bone marrow, embryology confirms that during the critical fetal hepatic stage of development, the liver and spleen function as the primary biological factories for blood formation. In adulthood, these organs transition into an indispensable regulatory supply chain; the liver executes Ranjana Karma (coloration) by functioning as a warehouse storing iron, Vitamin B12, and folic acid, synthesizing transferrin, and secreting erythropoietin. Concurrently, the spleen provides crucial quality control and architectural refinement through cellular culling, iron recycling, and pitting. This physiological relationship is pathologically validated, as severe blood channel vitiation mirrors modern hemolytic states that manifest as Pleeha Vriddhi (splenomegaly). Conclusion: The classical designation of the liver and spleen as the Moolasthanas (roots) of the Raktavaha Srotas represents an advanced, holistic systems-biology model. It accurately captures the lifelong logistical, regulatory, and quality control architecture necessary to produce and sustain healthy blood tissue

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KEYWORDS: Raktavaha Srotas, Erythropoiesis, Ayurveda, Yakrit and Pleeha (Liver and Spleen), Rakta Dhatu.

1. INTRODUCTION

Ayurveda is the ancient science of Indian Vedic culture, translating literally to "The wisdom of life" or "The knowledge of longevity". This traditional system of medicine emphasises the maintenance of a healthy status in human beings rather than just focusing on disease treatment. This core objective is immortalised in the classical principle:

प्रयोजनं चास्य स्वस्थस्य स्वास्थ्यरक्षणम्। आतुरस्य विकार प्रशमनं च॥
(च. सू 30/26)

Need for Study

The classical Acharyas described that the entire range of life processes in health and disease depends heavily on the *Srotas* (channel) system. This structural and functional network is highly prone to losing its integrity due to an out-of-order lifestyle and faulty dietary habits. Therefore, decoding the fundamental applied aspects of *Srotas* to understand the disease process in accordance with modern medical knowledge is the need of the hour. This study reviews ancient insights concerning the *Raktavaha Srotas* with special reference to modern erythropoiesis.

2. AIMS AND OBJECTIVES

- To study the detailed literary view of *Raktavaha Srotas*.
- To study the physiological process of erythropoiesis.
- To establish the clinical and physiological relationship between *Raktavaha Srotas* and erythropoiesis.
- To evaluate the specific roles of *Yakrut* (liver) and *Pleeha* (spleen) in blood formation.

3. MATERIAL AND METHODS

This study utilises a conceptual review methodology. The fundamental classical descriptions are extracted from the *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*, alongside contemporary data from standard modern textbooks of medical physiology and hematology. Insights are synthesized from previous peer-reviewed research mapping the anatomical, physiological, and therapeutic dimensions of *Raktavaha Srotas*.

4. REVIEW OF LITERATURE

4.1 Historical Context of Srotas

- **Vedas:** Srotas descriptions date back to the Vedic period. As the primitive source of knowledge, the Vedas present precise references to Srotas using terms like Asrava, Hira, Pantha, Srotya, Antresu, Dhamanya, Gavini, Nadi, Khani, and Snawani. These structures are predominantly constituted by Akash Mahabhuta. Anatomical descriptions are highly prevalent in the Atharvaveda and less so in the Yajurveda.
- **Upanishads:** The word *Srotas* or its synonyms appear in the *Kasthopnishad* (as *Khani*) and *Atmopnishad*, where it is compared to a fountain or waterfall to depict transportation. It is also found in the *Shwetashvaropnishad*.
- **Ayurvedic Samhita Kala:** This era marked a tremendous clarification and consolidation of concepts into classical textbooks. The anatomical, physiological, and pathological attributes of *Srotas* are thoroughly established across all major *Samhitas*.

4.2 Classical Concept and Definition of Srotas

According to Acharya Charaka, a *Srotas* is a structure through which *Sravanam Kriya* (oozing, permeation, or exudation) takes place. Acharya Sushruta defines *Srotas* by differentiating them strictly from macro-vascular structures like *Sira* (veins) and *Dhamani* (arteries):

मूलात् खादन्तरं देहे प्रसृतं त्वभिवहति यत्।
स्रोतःस्तदिति विज्ञेयं सिराधमनीवर्जितम्॥ (Su.Sh. 9/13)

Structures that originate from vacant spaces (hollow organs), spread throughout the body, and carry/purvey materials are understood as *Srotas*. Charaka further defines them as the transporting passages of *Dhatus* undergoing transformation.

Synonyms of Srotas

The multiple structural forms of *Srotas* are reflected through various classical synonyms: *Sira*, *Dhamni*, *Rasayani*, *Rasvahini*, *Nadi*, *Pantha*, *Marga*, *Sharirchidrani*, *Sthanani*, *Niketa*, *Ashaya*, *Rasvahaniya*, *Samvrita-asamvrita* (open and blind passages), and *Sharir Dhatwaavaksh*.

4.3 Morphology and Composition

The physical properties and structural appearances are detailed by Acharya Charaka:

स्वधातुसमवर्णानि वृत्तस्थूलान्यणूनि च।
स्रोतांसि दीर्घाण्याकृत्या प्रतानसदृशानि च॥ (Ch. V. 5/25)

- **Colour:** They share the exact colour of the specific Dhatu they carry.
- **Shape:** They are tubular (Vritta), can be large (Sthula) or microscopic (Anu), long (Dirgha), and branch-like or reticulated (Pratana) in shape.
- **Lotus Stem Analogy:** Acharya Sushruta and Vagbhata compare the *Srotas* network to the extremely fine, minute passages and pores present inside a lotus stem through which fluids pass.

Embryonic Formation

Vayu (specifically Vyana Vayu) executes Bhedan (splitting) and Darana Karma (assisted by *Ushma* or metabolic heat) to carve out gross and subtle channels within the tissues. Because they create *Avakash* (empty space), *Srotas* exhibit a strong predominance of *Akash Mahabhuta*, although their baseline physical constitution remains *Panchabhautic*.

Srotas are classified broadly into *Aparisankhye* (innumerable, matching the infinite corporeal structural entities of the body) and *Parisankhye* (countable macro-systems).

- **Charaka Samhita:** Enumerates 13 internal channels (*Antarmukha Srotas*) : *Pranavaha*, *Udakvaha*, *Annavaha*, *Rasavaha*, *Raktavaha*, *Mamsavaha*, *Medovaha*, *Asthivaha*,

Majjavaha, *Shukravaha*, *Mutravaha*, *Purishvaha*, and *Swedavaha*.

- **Sushruta Samhita:** Enumerates 11 pairs of internal channels, omitting *Asthivaha*, *Majjavaha*, and *Swedavaha*, but adding *Artavavaha Srotas*.
- **External Channels (*Bahirmukha Srotas*):** There are 9 open orifices in males and 12 in females (with the addition of 2 *Stana* and 1 *Rajovaha Srotas*).

4.5 Pathological Framework: Khavaigunya

The structural and functional integrity of *Srotas* is constantly challenged by daily metabolic wear and tear, digestive issues, and environmental stress. When *Doshas* become aggravated due to faulty factors, they migrate throughout the body. Wherever they encounter ***Kha Vaigunya*** (localized structural derangement or weakness within a channel), they arrest their movement, settle down, and cause ***Sroto Dushti***, leading to *Doshadushyasammuchana*—the foundational step of all diseases.

4.6 The Precursor System: Rasavaha Srotas

Before understanding blood, the precursor nutrient plasma system must be mapped:

- **Mula (Roots):** Heart (*Hridaya*) and great vessels.
- **Marga (Passage):** Venous and lymphatic systems.
- **Mukha (Orifices):** Arteriole-venous junctions in capillaries.

Etiology and Pathogenesis of Vitiation

गुरुशीतमतिस्निग्धमतिमात्र समश्नताम ।
रसवाहीनि दुष्यन्ति चिन्त्याना चातिचिन्तनात॥ (Ch.Vi. 5/21)

The *Rasavaha Srotas* are vitiated by the excessive consumption of calorie-dense, heavy foods (*Guru Ahara*), cold items (*Sheeta Ahara*), overly unctuous or oily items (*Atisnigdham*), and mental stress/excessive worry (*Chinta*).

Clinical Manifestations

अश्रद्धा चारुचिश्चास्यवैरस्यमरसज्ञता हृल्लासो गौरव तन्द्रा साङ्गमर्दों ज्वरस्तमः ।
पाण्डुत्व स्रोतसा रोघः क्लैब्य सादः कृशाङ्गता नाशोऽग्नेरयथाकाल वलयः पलितानि च॥ (Ch.Vi. 5/22)

Vitiation causes anorexia (*Aruchi*), nausea (*Hrillaso*), loss of taste (*Arasagyata*), anemia (*Pandu*), channel blockages (*Strotasaam Rodha*), premature graying and wrinkles (*Vali* and *Paalitya*), and diminished digestive capacity (*Agni Nasha*). Because *Agnimandya* and *Ama* (toxic undigested waste) are primary triggers, complete fasting therapy (***Langhana***) serves as the primary line of clinical defence.

5. Core Review: *Raktavaha Srotas* and Erythropoiesis

5.1 Anatomical Roots (Moolasthana) of *Raktavaha Srotas*

The primary anatomical origins or roots (*Mula*) governing the blood channels are explicitly defined across texts:

- **According to Acharya Charaka:**

शोणितवहानां स्रोतसां यकृन्मूलं प्लीहा च। (Ch. Vi 5/8)

The roots of *Raktavaha Srotas* are the ***Yakrit*** (liver) and ***Pleeha*** (spleen).

- **According to Acharya Sushruta:**

रक्तवहे द्वे, तयोर्मूलं यकृत्प्लीहानौ रक्तवाहिन्यश्च धमन्यः।
(Su. Sh 9/12)

The roots include the ***Yakrit*** (liver), ***Pleeha*** (spleen), and the vascular ***Raktavahini Dhamanis*** (blood-carrying arteries/vessels).

5.2 Etiology and Pathogenesis of Raktavaha Vitiation

विदाहीन्यन्नपानानि स्निग्धोष्णानि द्रवाणि च।
रक्तवाहीनि दुष्यन्ति भजतां चातपानलौ॥ (Ch.Vi. 5/14)

The blood channels become highly vitiated by over-indulging in foods and drinks that cause a burning sensation (*Vidahi*), are highly oily (*Snigdha*), overly hot (*Ushna*), or excessively liquid (*Drava*). Additionally, immediate post-meal exposure to the heat of the sun (*Atapa*) or fire (*Anala*) triggers pathogenetic shifts.

Clinical Manifestations of *Raktavaha Srotodushti*

Vitiation manifests as systemic skin and inflammatory pathologies:

कुष्ठविसर्पपिडकारक्तपित्तासृग्दराः।
गुदमेढ्रपाकप्लीहगुल्मविद्रधयनीलिकाः॥
कामलाव्यङ्गपिप्लवस्तिलकालकादद्रुचर्मदलाः।
श्वित्रपामाकोठास्रमण्डलाः॥ (Ch.Su. 28/11-12)

These include *Kushtha* (severe skin diseases), *Visarpa* (erysipelas), *Pidaka* (boils/carbuncles), *Raktapitta* (bleeding disorders), *Asrigdara* (menorrhagia), *Pleeha* (splenomegaly), *Kamala* (jaundice), *Vyanga* (melasma), and *Asramandala* (red circular erythematous patches).

5.3 Physiology and Functions of Rakta Dhatu

The fundamental process where nutrient plasma turns into blood is described as:

तेजो रसानां सर्वेषां मनुजानां यदुच्यते। पित्तोष्मणानुरागेण रसो रक्तत्वमृच्छति॥ (च.चि. १५/२८)

The pristine essence of *Ahara Rasa*, driven by the metabolic heat of *Pitta* (*Ranjaka Pitta*), takes on its characteristic deep red color and transforms into functional *Rakta Dhatu*.

Homeostatic Fluctuations

- **Rakta Vriddhi (Hyper-volemia/Increased Mass):**

'रक्तं रक्तांगाक्षिता सिरापूर्णत्वं च' । (Su.Su. 14/16)

Presents clinically as redness of the eyes and skin, along with the visible engorgement (fullness) of peripheral blood vessels.

- **Rakta Kshaya (Anemia/Deficiency):**

'रक्ते अम्लशिशिरप्रीतिः सिराशैथिल्यरूक्षता' । (A.Hr.Su. 11/17)

Presents as an intense craving for sour and cold foods, alongside the collapse (flaccidity/looseness) and marked dryness of the veins.

Vital Functions

The overriding action of *Rakta* is defined as ***Jeevana*** (the absolute sustenance of life):

'जीवनं नाम प्राणधारणम्' । (Hemadri on A.Hr.Su. 11/4)
'तत् विशुद्धं हि रुधिरं बलवर्णसुखायुषा । युनक्ति प्राणिनं प्राणः शोणितं हि अनुवर्तते' ।। (Cha.Su. 24/4)

Pure blood endows the organism with strength, excellent complexion, happiness, and long life; the vital *Prana* (life force) strictly follows and depends on the status of *Rakta*. It supplies *Prana* (vital oxygen) to every single tissue, organ, and cell to execute their physiological activities. It also provides immediate energy during muscle (*Mamsa Dhatu*) contraction and serves as the matrix for embryonic organogenesis.

Fetal Organogenesis

During intrauterine life, *Rakta Dhatu* plays an indispensable role in forming vital organs:

- Liver & Spleen: Formed directly from Shonita (blood).
- Lungs: Formed from the froth of blood (Shonita-phena).
- Colon: Derived from the waste residues of blood (Shonita-kitta).
- Kidneys: Formed from the essence of blood and fat (Rakta-medas prasaada).
- Heart: Synthesized from the clear essence of blood and phlegm (Shonita-kapha prasaada).

Rakta Dhatu Sara Purusha (Excellent Blood Constitution)

'कर्णाक्षिमुखजिह्वानासौष्ठपाणिपादतलनखललाटमेहनं च स्निग्धरक्तं श्रीमद्-भ्राजिष्णु रक्तसाराणाम्...' (Cha.Vi. 8/106)

Individuals possessing *Uttama Rakta Sarata* exhibit highly lustrous, glossy, and copper-red ears, eyes, oral cavities, tongues, palms, soles, and nails. They are highly attractive, intelligent, and happy, but show extreme intolerance to hot climates and heavy strenuous labor.

5.4 Chronology of Tissue Transformation (Dhatu Parinatikala)

The metabolic timeline required for nutritional fluid to fully transform across successive tissue layers differs between authorities:

Dhatu Stage	Formation Day (Charaka)	Formation Day (Sushruta)
Rasa	1st Day	1st Day
Rakta	2nd Day	5th Day
Mamsa	3rd Day	10th Day
Meda	4th Day	15th Day
Asthi	5th Day	20th Day
Majja	6th Day	25th Day
Shukra	7th Day	30th Day

According to the *Sharngadhara Samhita*, this process follows a sequential color shift known as **Varnaparivartana**, wherein the precursor fluid transitions across seven distinct chromatic stages: *Sweta* $\rightarrow$ *Kapota* $\rightarrow$ *Haridra* $\rightarrow$ *Padma* $\rightarrow$ *Kimsuka* $\rightarrow$ *Alaktaka* $\rightarrow$ *Rasaprakhya/Indragopa* (brilliant velvet red).

6. Contemporary Medical Concept: Erythropoiesis

Modern medicine defines erythropoiesis as the highly regulated physiological process by which new red blood cells (erythrocytes) are produced, ensuring continuous systemic oxygen transport capacity.

6.1 Developmental Sites of Erythropoiesis

The anatomical sites of red blood cell manufacture shift systematically during human development:

- **Mesoblastic Stage (3rd week to 3rd month of embryo):** Production occurs purely in the mesoderm of the embryonic yolk sac.
- **Hepatic Stage (3rd month to 7th month of fetus):** The ***Liver*** becomes the primary blood factory, with the ***Spleen*** and lymphoid tissues acting as secondary manufacturing sites.
- **Myeloid Stage (Late fetus to adulthood):** The red bone marrow completely takes over production. Up to age 5, virtually all bones manufacture red blood cells. After age 20, the shaft of long bones becomes fatty and inactive , restricting adult production entirely to membranous bones (vertebrae, sternum, ribs, and iliac crest).

6.2 Stages of Cellular Maturation

Stem cells pass through successive structural phases to form full red cells:

1. **Proerythroblast (Pronormoblast):** The first recognizable precursor cell. It is highly massive, with a large nucleus, but lacks hemoglobin entirely.
2. **Basophilic Erythroblast (Early Normoblast):** Nucleoli disappear and the cytoplasm stains deeply blue (basophilic) due to a massive synthesis of RNA to build ribosomes for hemoglobin manufacture.

3. **Polychromatophilic Erythroblast (Intermediate Normoblast):** Hemoglobin synthesis begins actively. The cytoplasm turns a "muddy" mixed color due to the dual presence of blue RNA and pink/red hemoglobin.
4. **Orthochromatic Erythroblast (Late Normoblast):** Hemoglobin concentration peaks, shifting the color to full pink/red. The nucleus condenses into an inactive state (pyknotic) and is completely extruded (pushed out) by the end of this stage.
5. **Reticulocyte:** An immature red cell that lacks a nucleus but retains a fine network (reticulum) of residual ribosomal RNA. It passes from the bone marrow spaces into the circulating capillaries via *diapedesis*.
6. **Mature Erythrocyte:** Within 1-2 days in the bloodstream, the remaining RNA breaks down completely. The cell stabilizes into a flexible, biconcave disc packed with hemoglobin, optimized for gas exchange.

6.3 Critical Regulatory Factors

- **Erythropoietin (EPO):** The chief hormonal regulator. When kidneys sense low oxygen levels (hypoxia), they secrete EPO into the blood. EPO travels to the marrow, stimulating proerythroblast proliferation and accelerating maturation.
- **Vitamin B12 and Folic Acid:** Required for DNA synthesis during rapid precursor cell division. Deficiency leads to maturation failure, producing abnormally large, fragile cells, resulting in *Megaloblastic Anemia*.
- **Iron:** The central material required to build the oxygen-binding *heme* portion of hemoglobin. Iron lack halts hemoglobin synthesis, producing small, pale cells, resulting in *Microcytic Hypochromic Anemia*.

7. DISCUSSION AND CRITICAL CORRELATIONS

7.1 Holistic Systems-Biology vs. Structural Isolation

The Ayurvedic concept of *Raktavaha Srotas* represents a holistic, systems-biology approach. While modern medicine narrows its definition of adult erythropoiesis structurally to the isolated cavities of bone marrow, Ayurveda maps out the entire physiological, logistical supply and regulatory chain as a single, unified functional block.

7.2 The Fetal Hepatic Alignment

The choice of *Moolasthana* (roots) by Acharya Charaka and Sushruta shows profound accuracy when evaluated against modern embryology. During the middle trimester of fetal development—the most critical formative phase of a human being—the ***Liver*** and ***Spleen*** serve as the literal manufacturing factories of blood (the Hepatic Stage of Erythropoiesis). Ancient sages documented human physiology by capturing this core embryological truth.

7.3 Yakrut (Liver) as the Biochemical Seat of Ranjaka Pitta

In classical text, *Ranjaka Pitta* is the localized metabolic fire responsible for "coloring" the clear nutrient plasma into red blood. In contemporary hematology, the red color of blood is due to hemoglobin synthesis, which relies completely on iron, Vitamin B12, and globin chains.

The liver functions as the primary repository and chemical warehouse for these precise factors:

- **Storage Logistics:** It stores massive quantities of Iron (as ferritin) and Vitamin B12 (holding a 1 to 3-year reserve).
- **Synthetic Support:** It manufactures *Transferrin* (the vital transport protein needed to carry iron safely to the bone marrow) and synthesizes the *globin* protein chains of hemoglobin.
- **Hormonal Regulation:** The liver continuously synthesizes and secretes about 10% of the body's *Erythropoietin* (EPO) in adults.

Therefore, the liver executes the functional duties of *Ranjaka Pitta* and *Raktadhatvagni* by processing the nutrient plasma and supplying the exact chemical materials needed to "color" and mature red blood cells.

7.4 Pleeha (Spleen) as the Quality Controller and Mechanical Filter

While the liver acts as the primary chemical supplier, the spleen serves as the quality controller of the *Raktavaha Srotas*, focusing heavily on structural and qualitative integrity. This perfectly matches its modern physiological functions:

- **Culling (The Graveyard):** Splenic macrophages inside the vascular red pulp act as a mechanical filter, trapping and destroying old, rigid, 120-day-old erythrocytes that can no longer safely pass through narrow capillaries.
- **Iron Recycling:** Upon destroying old cells, the spleen extracts iron from degraded hemoglobin and sends it back into circulation bound to transferrin, directly supplying the bone marrow to build new blood.
- **Pitting:** The spleen refines immature or minimally damaged cells by cutting out internal nuclear inclusions (like Heinz bodies) without destroying the cell itself.

Pathological Validation

In Ayurveda, chronic or severe vitiation of the blood channels leads first to ***Pleehodara*** or ***Pleeha Vriddhi*** (splenomegaly). Modern clinical science mirrors this perfectly: in hemolytic conditions where red blood cells are defective or broken down prematurely, the spleen works overtime to clear the debris, causing massive cellular enlargement (splenomegaly).

7.5 Amashaya (Stomach) and Mature Maturation Factors

Acharya Vagbhata explicitly localized a school of *Ranjaka Pitta* inside the *Amashaya* (stomach):

आमाशयाश्रयं पित्तं रञ्जकं रसरञ्जनात्। (अ.हृ.सू. १२/१३)

This insight aligns with modern gastric physiology. The parietal cells of the stomach lining secrete ***Intrinsic Factor***. Without Intrinsic Factor, dietary Vitamin B12 cannot be absorbed in the gut. A deficiency in this gastric mechanism leads to complete maturation failure of dividing red blood cells, culminating in *Pernicious Anemia*. Vagbhata's observation maps directly to the stomach's role in RBC maturation.

7.6 Adult Emergency Response: Extramedullary Hematopoiesis

The designation of the liver and spleen as the foundational roots (*Mula*) is clinically proven during adult marrow emergencies. If the adult bone marrow fails completely due to pathological conditions like myelofibrosis or radiation damage, the liver and spleen revert back to their embryonic states, resuming active blood cell production (known as Extramedullary Hematopoiesis).

8. Comparative Matrix

The correlation between classical Ayurvedic models and modern haematological discoveries can be summarised across core features:

Feature	Ayurvedic Concept (Raktavaha Srotas)	Modern Concept (Erythropoiesis)
Origin / Roots	*Yakrit* (Liver) and *Pleeha* (Spleen).	Liver and Spleen during fetal development (Hepatic Stage); site of adult extramedullary backup.
Precursor Fluid	*Ahara Rasa* / *Rasa Dhatu* (Nutrient Plasma).	Hematopoietic Stem Cells & nutrient-rich blood plasma.
Coloring / Maturation	*Ranjaka Pitta* (situated in Liver, Spleen, and Stomach).	Hemoglobin synthesis, driven by Iron, B12, Folate, and Intrinsic Factor.
Quality Control	*Pleeha* acts as the filtering, refining, and regulatory center.	Splenic red pulp filters blood, executes culling, pitting, and recycles iron.
Pathological Shift	Vitiation of *Rakta* leads immediately to *Pleeha Vriddhi*.	Hemolytic anemias or marrow failure cause splenomegaly.

9. SUMMARY AND CONCLUSION

Ayurveda views blood formation not as an isolated cellular event restricted to bone cavities, but as a continuous metabolic transformation (*Ahara Rasa* $\rightarrow$ *Rasa Dhatu* $\rightarrow$ *Rakta Dhatu*) driven by *Jatharagni*, *Ranjaka Pitta*, and *Raktadhatvagni*. Modern embryology, physiology, and pathology validate the classical stance. The liver and spleen serve as the anatomical blood factories during the fetal hepatic stage, while in adulthood they provide the biochemical raw materials, recycling machinery, and quality control systems required to sustain erythropoiesis.

REFERENCES

1. Agnivesha. Charaka Samhita. Revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Vimana Sthana, Ch. 5.
2. Agnivesha. Charaka Samhita. Revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Sutra Sthana, Ch. 24 (Vidhi Shonitiya Adhyaya).
3. Agnivesha. Charaka Samhita. Revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Sutra Sthana, Ch. 28 (Vividhashitapitiya Adhyaya).
4. Agnivesha. Charaka Samhita. Revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Chikitsa Sthana, Ch. 15.
5. Sushruta. Sushruta Samhita. With Nibandha Samgraha commentary of Dalhanacharya. Acharya JT, editor. Varanasi: Chaukhambha Orientalia; 2014. Sharira Sthana, Ch. 9 (Dhamani Vyakarana Sharira).
6. Sushruta. Sushruta Samhita. With Nibandha Samgraha commentary of Dalhanacharya. Acharya JT, editor. Varanasi: Chaukhambha Orientalia; 2014. Sutra Sthana, Ch. 14 (Shonitavarnaniya Adhyaya).
7. Sushruta. Sushruta Samhita. With Nibandha Samgraha commentary of Dalhanacharya. Acharya JT, editor. Varanasi: Chaukhambha Orientalia; 2014. Sutra Sthana, Ch. 21 (Vranaprashna Adhyaya).
8. Hall JE. Guyton and Hall Textbook of Medical Physiology. 14th ed. Philadelphia: Elsevier; 2021.
9. Barrett KE, Barman SM, Brooks HL, Yuan JXJ. Ganong's Review of Medical Physiology. 26th ed. New York: McGraw-Hill Education; 2019.
10. Hoffbrand AV, Moss PAH. Hoffbrand's Essential Haematology. 8th ed. Hoboken (NJ): Wiley-Blackwell; 2019.
11. Kumar V, Abbas AK, Aster JC. Robbins and Cotran Pathologic Basis of Disease. 10th ed. Philadelphia: Elsevier; 2020.
12. Kaushansky K, Lichtman MA, Prchal JT, Levi MM, Press OW, Burns LJ, Caligiuri MA. Williams Haematology. 10th ed. New York: McGraw-Hill Education; 2021.

About the Corresponding Author

Dr. Utkarsh Sharma is associated with the Department of Post Graduate Studies in Kriya Sharir at Jammu Institute of Ayurveda and Research, Jammu, India. His academic and research interests focus on Ayurvedic physiology, integrative health sciences, and traditional medical knowledge. He is actively involved in teaching, research, and the promotion of evidence-based Ayurveda in higher education and healthcare.