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# *DRAVYA GAMITVA* AND *DHATU-UTPATTI SIDDHANTA*: AN INTEGRATED FRAMEWORK OF AYURVEDIC ORGAN-SPECIFIC *CHIKITSA SUTRA* WITH CORRELATIONS TO MODERN ORGANOGENESIS AND PHYSIOLOGY

**[1]Dr. Shashidhar V. Emmi, [2]Dr. Kumar Chaudappalavar, [3]*Dr. Megha Chikkoppa**

[1]Professor, Department of Rachana Shareera.

[2]Professor, Department of Dravyaguna vijnana.

[3]Post Graduate Scholar Pre Final. Dept of Dravyaguna Vijnana.

Shri D.G.M. Ayurvedic Medical College and Hospital, PG, Ph.D Studies and Research Centre, Gadag, Karnataka.

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***Corresponding Author**

**Dr. Megha Chikkoppa**

Post Graduate Scholar Pre Final. Dept of Dravyaguna Vijnana. Shri D.G.M. Ayurvedic Medical College and Hospital, PG, Ph.D Studies and Research Centre, Gadag, Karnataka.

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## ABSTRACT

**Background:** *Dravya Gamitva* (organ-specific drug affinity) is a fundamental pharmacological concept enshrined in classical *Ayurvedic* texts. When integrated with *Dhatu-Utpatti Siddhanta* (the doctrine of tissue/organ formation from embryological precursors), it provides a systematic, physiology-based framework for organ-specific therapeutics. Classical texts such as the Charaka Samhita[1] and Sushruta Samhita[2] describe organ formation (*Garbha Nirman*) through *Shadbhava*, identifying the *Dhatu* and *Dosha* constitution of each organ — a framework that directly informs rational pharmacotherapy.

**Objectives**

1) To undertake a comprehensive literary review of *Dravya Gamitva* and *Dhatu-Utpatti Siddhanta* from classical sources.
2) To establish organ-wise Chikitsa Sutras.
3) To correlate Ayurvedic organogenesis with modern embryology and physiology.
4) To propose a validated clinical trial protocol for testing *Dravya Gamitva* principles in a single organ system.

**Materials & Methods:** A systematic literary review of primary classical texts (*Brihatrayee*

*and Laghutrayee)*, secondary commentaries (Chakrapanidatta, Dalhana, Hemadri), and relevant modern embryology and pharmacology literature was conducted. Textual data were extracted, tabulated, and analysed using a thematic framework. Correlation tables and a clinical trial protocol were developed based on the synthesised findings. **Results:** Eight major organ systems *(Vrukka, Hridaya, Yakrit, Pleeha, Phupphusa, Amashaya, Pakwashaya, Mastishka*) were mapped to their classical *Dhatu* origin, *Dosha* constitution, *Mala*, and *Chikitsa Sutra*. Organ-specific *Dravya*s were identified based on *Gamitva, Pratyatma Lakshana, and Prabhava*. Comparative tables reveal significant conceptual parallels between *Ayurvedic Dhatu*-based organogenesis and modern mesoderm/endoderm-based germ layer organogenesis. A six-step clinical trial protocol for *Vrukka Roga* (renal disease) using *Gokshura, Punarnava*, and *Varuna* was designed. **Conclusion:** Ayurvedic organ-specific treatment is not empirical but is grounded in *Dhatu*-based physiology. The integration of *Dravya Gamitva* with *Dhatu-Utpatti Siddhanta* offers a scientifically coherent, reproducible framework for developing evidence-based Ayurvedic clinical protocols. This model holds significant promise for translational research.

**KEYWORDS:** *Dravya Gamitva, Dhatu-Utpatti Siddhanta,* Organogenesis, *Garbha Nirman, Chikitsa Sutra, Pratyatma Lakshana, Prabhava*, Organ-specific pharmacology, Ayurvedic physiology.

## I. INTRODUCTION

### 1.1 Background and Rationale

*Ayurveda*, as a system of life science, offers a holistic yet remarkably precise approach to pharmacotherapy. Central to this precision is the doctrine of ***Dravya Gamitva*** — the principle by which a drug exerts preferential affinity for a specific organ, tissue (*Dhatu*), or system. This concept, though expressed in classical Sanskrit terminology, mirrors the modern pharmacological concepts of drug-receptor specificity and organ tropism.[1]

The theoretical foundation of organ affinity in *Ayurveda* is inseparable from the doctrine of ***Dhatu-Utpatti Siddhanta*** — the systematic account of how each organ (*Avayava*) and tissue (*Dhatu*) is formed embryologically from specific precursors through the process of *Shadbhava* (six contributing factors). Acharya Sushruta explicitly states.

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Meaning: Organ formation occurs from the respective contribution of *Matruja* (maternal), *Pitruja* (paternal), *Atmaja* (soul), *Satmyaja* (habituation), *Rasaja* (nutrition), and *Sattvaja* (psychic) factors— collectively called *Shadbhava.*

Further, the origin of specific organs from *Dhatu-Prasada* (the refined essence of tissues) is a recurring theme. Acharya Sushruta delineates:[2]

□□□□□□□□ □□□□□□□□□□ □□□□□□ (Sushruta Samhita, *Sharira Sthana* 4/25)[2]
Meaning: The kidneys (*Vrukka*) are formed from the refined essence *(Prasada*) of *Rakta* (blood) and *Meda (*adipose*) Dhatus.*

This embryological specificity directly governs pharmacotherapy: a drug that targets *Rakta* and *Meda Dhatus* will, by virtue of organ formation logic, also exert affinity for the kidney. This is the epistemological bedrock of *Dravya Gamitva* in Ayurvedic pharmacology.[3]

### 1.2 Significance of *Dravya Gamitva*

The Charaka Samhita defines the scope of drug action through the triad of *Rasa-Guna-Virya-Vipaka* (RGVV) and a fourth, unexplained category — *Prabhava* (specific potency). While RGVV accounts for most pharmacological actions, *Prabhava* accounts for effects that transcend these properties — analogous to modern drug 'idiosyncratic' or 'specific receptor-mediated' actions.[3]

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□□□□□□□ □ □□□□□□ □□□□□□□□□ (Charaka Samhita, *Sutra Sthana* 26/67)[1]

The concept of *Pratyatma Lakshana* — the unique identifying therapeutic indicator of a drug — further refines organ-specific drug selection. Together, *Gamitva* + *Pratyatma Lakshana* + *Prabhava* constitute a tripartite pharmacological framework that is remarkably analogous to modern target-based drug delivery systems.[4]

### 1.3 Objectives of the Study

1. To conduct a comprehensive literary review of *Dravya Gamitva* and *Dhatu-Utpatti Siddhanta* from *Brihatrayee, Laghutrayee,* and allied classical texts.
2. To correlate Ayurvedic *Dhatu*-based organogenesis with modern embryological germ layer theory and organ physiology.
3. To establish organ-wise *Chikitsa Sutras* based on *Dhatu* origin, *Dosha* constitution, and

*Mala* relation.

4. To construct comparative tables illustrating parallels between Ayurvedic and modern physiology across eight organ systems.
5. To develop a publication-quality schema of organogenesis flow and Chikitsa decision framework.
6. To design a structured clinical trial protocol (Phase II design) for testing the *Dravya Gamitva* model in *Vrukka Roga* (renal disease).

## II. MATERIALS AND METHODS

### 2.1 Study Design

This study employs a qualitative, descriptive literary review methodology. Primary data were sourced exclusively from classical Ayurvedic texts; secondary data were drawn from peer-reviewed modern biomedical literature for comparative analysis. The study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework adapted for classical literary review, as recommended by NCISM Research Guidelines 2023.

### 2.2 Primary Classical Sources

| S.No. | Text | Sthaana/Section | Topics Reviewed |
|---|---|---|---|
| 1 | Charaka Samhita (Agnivesha; redacted Charaka, Dridhabala)[1] | *Sharira Sthana Ch.* 3, 4; *Sutra Sthana Ch. 1*, 26, 28 | *Shadbhava*, Organogenesis, *Rasa-Guna-Prabhava, Chikitsa Sutra* |
| 2 | Sushruta Samhita[2] | *Sharira Sthana Ch.* 4, 5; *Sutra Sthana Ch.*15, 45 | *Dhatu* organ formation, Surgical anatomy, *Dravya* classification |
| 3 | Ashtanga Hridayam (Vagbhata)[5] | *Sharira Sthana* Ch. 3; *Sutra Sthana* Ch. 1, 10 | Organogenesis, *Dhatu* physiology, *Chikitsa* |
| 4 | Ashtanga Sangraha (Vagbhata)[6] | *Sharira Sthana* Ch. 2, 3 | *Dhatu* formation, embryological correlations |
| 5 | Bhavaprakasha Nighantu[7] | Purvakhanda | *Drug Gamitva*, organ-affinity classification |
| 6 | Dhanvantari Nighantu[8] | Full text | Drug properties, *Pratyatma Lakshana* |
| 7 | Chakradatta[9] | Organ-specific chapters | *Chikitsa Sutras*, formulations |
| 8 | Sharangadhara Samhita[10] | Uttarakhanda | Pharmacology, preparations |

### 2.3 Secondary (Modern) Sources

Modern references included: Moore KL et al. 'The Developing Human: Clinically Oriented Embryology' (11th edition);[11] Guyton and Hall 'Textbook of Medical Physiology' (14th edition)[12]; Rang HP et al. 'Rang & Dale's Pharmacology' (9th edition)[13]; and peer-reviewed

publications from MEDLINE, PubMed, and Scopus databases using search terms: 'Ayurvedic pharmacology AND organ specificity', '*Dravya Gamitva'*, *'Dhatu* physiology', 'organogenesis *Ayurveda'*.

### 2.4 Inclusion and Exclusion Criteria Inclusion Criteria

- Classical texts from *Brihatrayee* and *Laghutrayee* tradition with direct content on *Dhatu*, *Dosha*, organogenesis or drug *Gamitva*
- Peer-reviewed publications (2000–2024) on Ayurvedic pharmacology with biochemical or physiological correlations
- Studies with documented clinical outcomes of organ-specific Ayurvedic drugs

**Exclusion Criteria**

- Non-authenticated classical texts and manuscripts without critical editions
- Grey literature, anecdotal reports, and unpublished theses without institutional validation
- In vitro studies without physiological correlation

### 2.5 Data Extraction and Analysis

Relevant *shlokas* (verses) were extracted, transliterated, translated, and subjected to *Anvaya* (syntactic analysis) and *Vivarana* (explanatory commentary) following traditional Ayurvedic hermeneutics. Thematic coding was performed to identify: (1) organ formation data, (2) *Dosha-Dhatu* constitution, (3) *Dravya Gamitva*, (4) *Pratyatma Lakshana*, (5) *Prabhava*, and (6) *Chikitsa Sutra*. Comparative matrices were constructed using a pre-designed framework aligning classical Ayurvedic concepts with modern physiological equivalents.

## III. RESULTS

### 3.1 Fundamental Principles — *Dhatu-Utpatti Siddhanta*

#### 3.1.1 *Shadbhava* — The Six Factors of Organogenesis

The foundational principle of Ayurvedic embryology is the *Shadbhava* doctrine. Acharya Charaka enumerates six formative contributors to the developing organism:[1]

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Meaning: *Matruja* (maternal contribution), *Pitruja* (paternal contribution), *Atmaja* (soul-contributed), *Satmyaja* (habituation), *Rasaja* (nutritional), and *Sattvaja* (mental/psychic) —

these six are the formative factors of the embryo.

**Table 1: Correlation of *Shadbhava* (Ayurvedic embryological factors) with modern developmental biology equivalents.[1-11]**

| *Shadbhava* | Classical Source | Structures Contributed | Modern Embryological Equivalent |
|---|---|---|---|
| *Matruja* | Ch. Sha. 3/14[1] | Soft tissues, skin, muscles, blood vessels, fat | Contribution of maternal mitochondrial DNA; uterine environment |
| *Pitruja* | Ch. Sha. 3/14[1] | Hard structures — bones, nails, hair, teeth, semen | Paternal nuclear genome; skeletal determinants |
| *Atmaja* | Ch. Sha. 3/14[1] | Lifespan, sense organs, consciousness, intellect | Epigenetic programming; neural development |
| *Satmyaja* | Ch. Sha. 3/14[1] | Health, strength, complexion, longevity | Gene-environment interactions; nutritional epigenetics |
| *Rasaja* | Ch. Sha. 3/14[1] | All bodily structures sustained by maternal nutrition | Placental nutrient transfer; trophoblast function |
| *Sattvaja* | Ch. Sha. 3/15[1] | Memory, intellect, courage, purity of mind | Neuropsychological development; HPA axis programming |

### 3.1.2 *Dhatu-Prasada* Based Organogenesis — Classical Evidence

Sushruta Samhita provides the most explicit account of organ formation from *Dhatu-Prasada* (refined tissue essence). Acharya Sushruta states:[2]

□□□□□□□□□□□□□ □□□□□□ (Sushruta Samhita, *Sharira Sthana* 4/26)[2] Meaning: The heart (*Hridaya*) is formed from the refined essence (*Prasada*) of *Rakta Dhatu*.

□□□□□□□□ □□□□□□□□□ □□□□□□ (Sushruta Samhita, *Sharira Sthana* 4/25)[2] Meaning: The kidneys (*Vrukka*) are formed from the *Prasada* of both *Rakta* (blood/vascular) and *Meda (*adipose/lipid*) Dhatus.*

Ashtanga Hridayam further elaborates on the role of *Prana Vata* in sustaining organ function after formation, specifically in the *Hridaya* and *Mastishka*, emphasising that Chikitsa must address both the originating *Dhatu* and the governing *Dosha* simultaneously.[5]

### 3.2 Organ-wise Dhatu Origin, Dosha Constitution & Chikitsa Sutra

**Table 2: Organ-wise *Dhatu* Origin, *Dosha* Constitution, and *Chikitsa Sutras* compiled from *Brihatrayee*.[1,2,5]**

| Organ (Ayurvedic) | Classical Reference | Dhatu Origin (Prasada) | Governing Dosha | Mala | Chikitsa Sutra |
|---|---|---|---|---|---|
| *Vrukka* | Su. Sha. 4/25[2] | *Rakta + Meda* | *Kapha + Pitta* | *Mutra* | *Rakta Prasadana +* |

| | | | | | |
|---|---|---|---|---|---|
| (Kidney) | | | | | *Medo Shoshana + Mutrala* |
| *Hridaya* (Heart) | Su. Sha. 4/26[2] | *Rakta (Rasa-Rakta)* | *Vyana Vata + Sadhaka Pitta* | *None directly* | *Hridya + Rasayana + Vata-Pitta Shamana* |
| *Yakrit* (Liver) | Ch. Sha. 4[3] | *Rakta* | *Pitta (Ranjaka)* | *Pitta* | *Pitta Shamana + Rakta Prasadana + Deepana-Pachana* |
| *Pleeha* (Spleen) | Su. Sha. 4[2] | *Rakta* | *Kapha + Pitta* | *Rakta (Mala)* | *Rakta Shodhana + Lekhana + Deepana* |
| *Phupphusa* (Lungs) | A.H. Sha. 3[5] | *Rasa + Rakta* | *Prana Vata + Avalambaka Kapha* | *None directly* | *Kapha Shamana + Prana Vata Anulomana* |
| *Amashaya* (Stomach) | Ch. Su. 28[1] | *Rasa (formation site)* | *Kledaka Kapha* | *Rasa (Kleda)* | *Deepana + Pachana + Kapha Shamana* |
| *Pakwashaya* (Intestine) | Ch. Chi. 15[1] | *Rasa absorption site* | *Apana Vata + Samana Vata* | *Purisha* | *Vatanulomana + Mridu Virechana* |
| *Mastishka* (Brain) | A.H. Sha. 3[5] | *Majja + Shukra* | *Prana Vata* | *None directly* | *Medhya Rasayana + Vata Shamana + Brimhana* |

### 3.3 Organ-wise *Dravya Gamitva* — Drug Profiles

**Table 3: Organ-wise *Dravya Gamitva* profiles with *Pratyatma Lakshana, Prabhava,* and classical references.[1,2,5,7,8,9]**

| Organ | Drug (*Dravya*) | Botanical Name | *Gamitv a* (Target Srotas) | *Pratyatma Lakshana* | *Prabhava* (Specific Action) | Classical Reference |
|---|---|---|---|---|---|---|
| *Vrukka* | *Gokshura* | *Tribulus terrestris* L. | *Mutrav aha Srotas* | *Mutrala* (diuretic) | *Vrukka-balya;* strengthens renal parenchyma | Bhavapraka sha, *Guduchyad i Varga*[7] |
| *Vrukka* | *Punarnava* | *Boerhavia diffusa* L. | *Mutrav aha + Raktava ha* | *Shothaghna, Mutrala* | Specific anti-oedema beyond its *Guna* | Ch. Su. 2;[1] Bhavapraka sha[7] |
| *Vrukka* | *Varuna* | *Crataeva nurvala* Buch.-Ham. | *Mutrav aha Srotas* | *Ashmari-bhedana* | Specific lithotropic (stone-breaking) effect | Dhanvantar i Nighantu[8] |
| *Hridaya* | *Arjuna* | *Terminali a arjuna* Roxb. | *Raktava ha Srotas* | *Hridya* (cardiotonic) | Cardiac musculotropic; myocardial strengthening | Chakradatta, *Hridroga Chikitsa*[9] |
| *Hridaya* | *Pushkarmo ola* | *Inula racemosa* Hook.f. | *Pranav aha + Raktava ha* | *Vatahara, Hridya* | Specific bronchocardiac vasodilation | Ch. Chi. 12[1] |
| *Hridaya* | *Brahmi* | *Bacopa monnieri* (L.) Wettst. | *Majjava ha Srotas* | *Medhya, Hridya* | Adaptogenic cardiac calming; anxiolytic | A.H. Su. 6[5] |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Yakrit* | *Bhumyamalaki* | *Phyllanthus niruri* L. | *Raktava ha + Pittava ha* | *Yakrit-uttjeevana (*hepatoprotective*)* | Specific hepatocyte regeneration | Bhavaprakasha[7] |
| *Yakrit* | *Katuki* | *Picrorhiza kurroa* Royle | *Pittava ha Srotas* | *Pittarechana* (cholagogue*)* | Specific bile secretion stimulation | Charaka Samhita, *Tikta Dravyas*[1] |

| **Organ** | **Drug (*Dravya*)** | **Botanical Name** | ***Gamitva* (Target Srotas)** | ***Pratyatma Lakshana*** | ***Prabhava* (Specific Action)** | **Classical Reference** |
|---|---|---|---|---|---|---|
| *Yakrit* | *Kalmegha* | *Andrographis paniculata* Nees | *Raktava ha + Pittava ha* | *Yakrit-uttjeevana* | Anti-inflammatory; NF-κB inhibition documented | Bhavaprakasha, *Haritakyadi Varga*[7] |
| *Phupphusa* | *Vasa* | *Adhatoda vasica* Nees | *Pranavaha Srotas* | *Shwasahara* (bronchodilator) | Mucolytic; specific *Kapha-Vata in Pranavaha* | Ch. Chi. 17[1] |
| *Mastishka* | *Shankhapushpi* | *Convolvulus pluricaulis* Choisy | *Majjavaha Srotas* | *Medhya (*nootropic*)* | Acetylcholinesterase inhibition (documented) | Charaka, *Medhya Rasayana*[1] |

### 3.4 *Dhatu*-wise *Chikitsa* Logic — Core Framework.

**Table 4: *Dhatu*-wise *Chikitsa* framework derived from Charaka Samhita, Sushruta Samhita, and Ashtanga Hridayam.[1,2,5]**

| ***Dhatu* (Tissue)** | ***Dosha* Dominance** | ***Agni*** | ***Upadhatu*** | ***Mala*** | ***Chikitsa* Principle** | **Key *Dravyas*** |
|---|---|---|---|---|---|---|
| *Rasa* (Plasma/Lymph) | *Kapha* | *Rasagni* | *Stanya, Artava* | *Kapha* | *Rasayana,Brimhana, Laghu-Ahara* | *Shatavari, Ashwagandha* |
| *Rakta* (Blood) | *Pitta* | *Raktagni* | *Kandara, Sira* | *Pitta* | *Rakta Shodhana, Tikshnagni-deepana* | *Manjishtha, Guduchi, Neem* |
| *Mamsa* (Muscle) | *Kapha* | *Mamsa gni* | *Vasa, Twak* | *Khamala* (wax/secretion) | *Lekhana* (if excess), *Brimhana* (if deficient) | *Ashwagandha, Bala* |
| *Meda* (Adipose) | *Kapha* | *Medagni* | *Snayu, Bandha* | *Sweda* | *Medohara — Lekhaniya Gana* | *Guggulu, Triphala, Trikatu* |

| ***Dhatu* (Tissue)** | ***Dosha* Dominance** | ***Agni*** | ***Upadhatu*** | ***Mala*** | ***Chikitsa* Principle** | **Key *Dravyas*** |
|---|---|---|---|---|---|---|
| *Asthi* (Bone) | *Vata* | *Asthyagni* | *Danta, Nakha* | *Nakha, Kesha* | *Asthi Poshana — Vata* | *Shatavari, Laksha, Arjuna* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | *Shamana* | |
| *Majja* (Marrow/Nerve) | *Kapha* | *Majjag ni* | *Akshi sneha* | *Netra sneha* (tears/lubricants) | *Brimhana* — *Rasayana* | *Brahmi, Shatavari, Ashwagandha* |
| *Shukra* (Reproductive) | *Kapha* | *Shukra gni* | *Ojas* (para-product) | None | *Vrishya* — *Rasayana* | *Shilajatu, Ashwagandha, Shatavari* |

### 3.5 Comparative Analysis: Ayurvedic Physiology vs. Modern Physiology

#### 3.5.1 Organogenesis — Ayurvedic vs. Modern Embryology

**Table 5: Comparative organogenesis — Ayurvedic *Dhatu-Prasada* origin vs. modern germ layer derivation.[2,5,11]**

| Organ | Ayurvedic *Dhatu* Origin (*Prasada*) | Ayurvedic Governing Dosha | Modern Germ Layer Origin | Modern Tissue Type | Correlation Strength |
|---|---|---|---|---|---|
| *Vrukka* (Kidney) | *Rakta* + *Meda Prasada* (Su. Sha. 4/25)[2] | *Kapha* + *Pitta* | Intermediate Mesoderm (Metanephros)[11] | Excretory tubular epithelium + Glomerular endothelium | Strong — *Rakta* ↔ vascularity; *Meda* ↔ peri-nephric fat / lipid metabolism |
| *Hridaya* (Heart) | *Rakta Prasada* (Su. Sha. 4/26)[2] | *Vyana Vata* + *Sadhaka Pitta* | Lateral Plate Mesoderm (Cardiogenic plate)[11] | Cardiac muscle (myocardium) + Endocardium | Strong — *Rakta Prasada* ↔ cardiogenic mesoderm = vascular/blood origin |
| *Yakrit* (Liver) | *Rakta Dhatu* transformation (Ch. Sha. 4)[3] | *Ranjaka Pitta* | Endoderm (hepatic diverticulum from foregut)[11] | Hepatocytes + Kupffer cells | Moderate — functional (*Ranjana* = bile/blood pigment formation) > developmental |
| *Pleeha* (Spleen) | *Rakta Dhatu ashrita* (Su. Sha. 4)[2] | *Kapha* + *Pitta* | Dorsal Mesogastrium (Mesoderm)[11] | Lymphoid + haematogenic tissue | Strong — *Rakta ashrita* ↔ haematopoietic; splenic blood reservoir |
| *Phupphusa* (Lung) | *Rasa* + *Rakta Prasada* (A.H. Sha. 3)[5] | *Prana Vata* + *Avalambaka Kapha* | Endoderm (laryngotracheal bud) + Splanchnic Mesoderm[11] | Bronchial epithelium + Pulmonary vasculature | Moderate — *Rasa* ↔ plasma perfusion; *Kapha* ↔ mucosal lining |
| *Amashaya* (Stomach) | *Rasa*-formation site (Ch. Su. 28)[1] | *Kledaka Kapha* | Endoderm (foregut)[11] | Gastric mucosa + Chief + Parietal cells | Moderate — Rasa formation ↔ digestive secretion; |

| Organ | Ayurvedic *Dhatu* Origin (*Prasada*) | Ayurvedic Governing Dosha | Modern Germ Layer Origin | Modern Tissue Type | Correlation Strength |
|---|---|---|---|---|---|
| | | | | | *Kapha* ↔ mucus |
| *Pakwashaya* (Intestine) | *Rasa* absorption; *Purisha* formation | *Apana Vata* + *Samana Vata* | Endoderm (midgut/hindgut) [11] | Villous enterocytes + Enteric nervous system | Strong — *Vata* ↔ enteric nervous system; absorption + motility |
| *Mastishka* (Brain) | *Majja* + *Shukra Prasada* (A.H. Sha. 3)[5] | *Prana Vata* | Ectoderm (Neural tube)[11] | Neurons + Glia + Myelin (*Majja* ↔ myelin) | Strong — *Majja* ↔ myelin/neural fat; *Prana Vata* ↔ neural conduction |

### 3.5.2 *Dravya Gamitva* vs. Modern Pharmacological Drug-Receptor Concepts

**Table 6: *Dravya Siddhanta* vs. modern pharmacological concepts — systematic comparative analysis.[1, 3, 12, 13]**

| Ayurvedic Concept | Classical Definition | Modern Pharmacological Equivalent | Example |
|---|---|---|---|
| *Dravya Gamitva* | Organ/tissue-specific affinity of a drug beyond its general *Rasa-Guna-Virya* | Drug-receptor specificity; organ tropism; pharmacokinetic tissue distribution | *Gokshura* → *Mutravaha* = Tribulus → renal tubular ATP binding |
| *Pratyatma Lakshana* | The unique therapeutic action that identifies (characterises) a specific drug | Pharmacodynamic signature; specific pharmacological action; drug 'fingerprint' | *Arjuna* → *'Hridya'* = *Terminalia* → cardiac β1-adrenoceptor modulation |
| *Prabhava* | Specific unexplained potency beyond *Rasa-Guna-Virya-Vipaka* | Idiosyncratic pharmacological effect; receptor-independent mechanism; hormetic effect | *Punarnava* → anti-oedema = *Boerhavia* → aquaporin modulation (documented) |
| **Ayurvedic Concept** | **Classical Definition** | **Modern Pharmacological Equivalent** | **Example** |
| *Rasa* (Taste) | Six tastes governing initial physiological action | Drug physicochemical properties — ionisation, pH, charge, receptor binding tendency | *Tikta (bitter) Rasa* → *Pitta Shamana* = bitter alkaloids → hepatic P450 induction |
| *Guna* (Quality) | 20 physical qualities governing tissue interaction | Drug physicochemical properties — lipophilicity, molecular weight, viscosity | *Snigdha* (unctuous) *Guna* → membrane penetration = lipophilic drug → BBB crossing |
| *Virya* (Potency) | Ushna/Sheeta — the primary active energy | Thermogenic/anti-inflammatory property; COX-1/COX-2 modulation | *Ushna Virya* → anti-inflammatory (*Shunti*) = COX-2 inhibition (6-shogaol) |
| *Vipaka* (Post-digestive) | Final metabolic transformation in tissues | Drug metabolite pharmacology; first-pass metabolism; enterohepatic recirculation | *Madhura Vipaka* = anabolic metabolites; *Katu Vipaka* = catabolic liver metabolism |

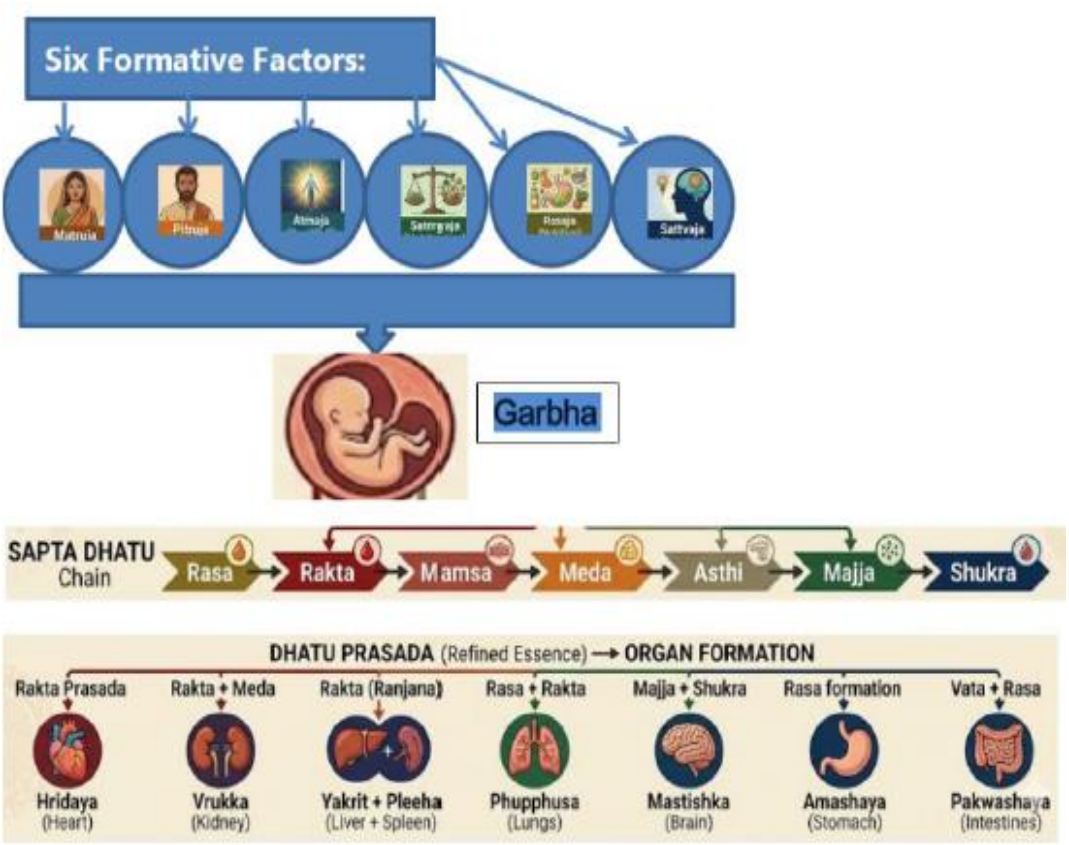
### 3.5.3 *Dosha*-Physiology Correlation.

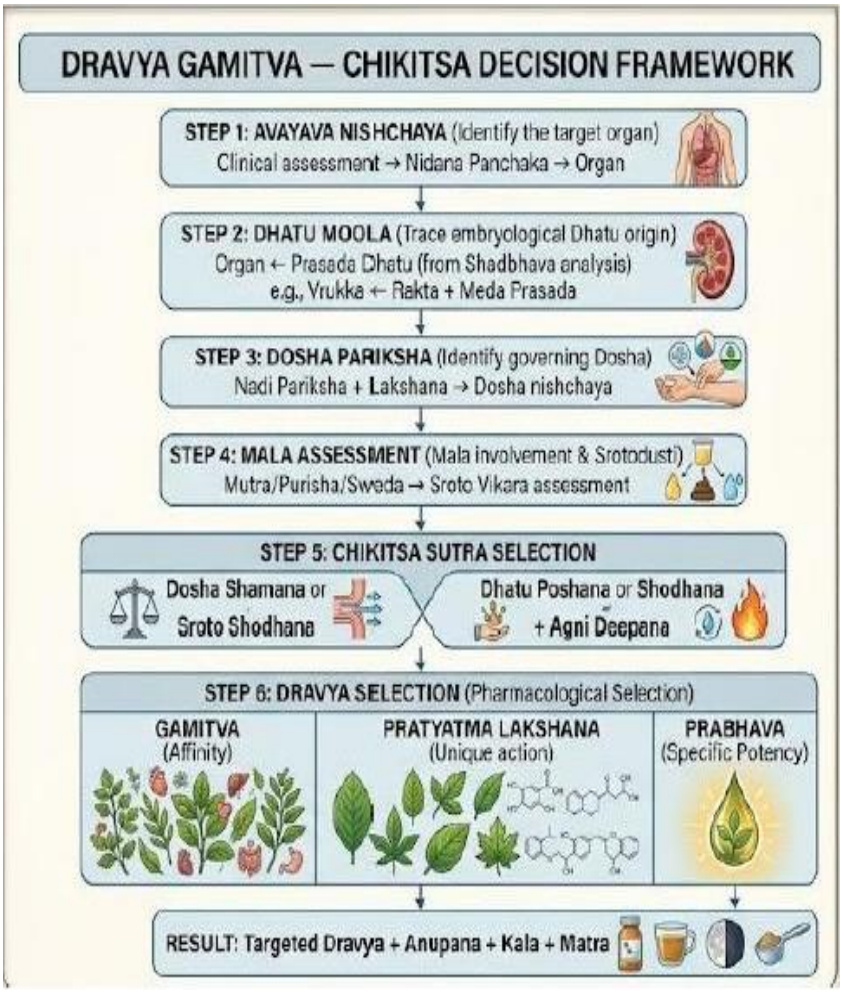
**Table 7*: Dosha* sub-type correlations with modern physiology based on *Brihatrayee* descriptions and modern biomedical literature.[1,5,12]**

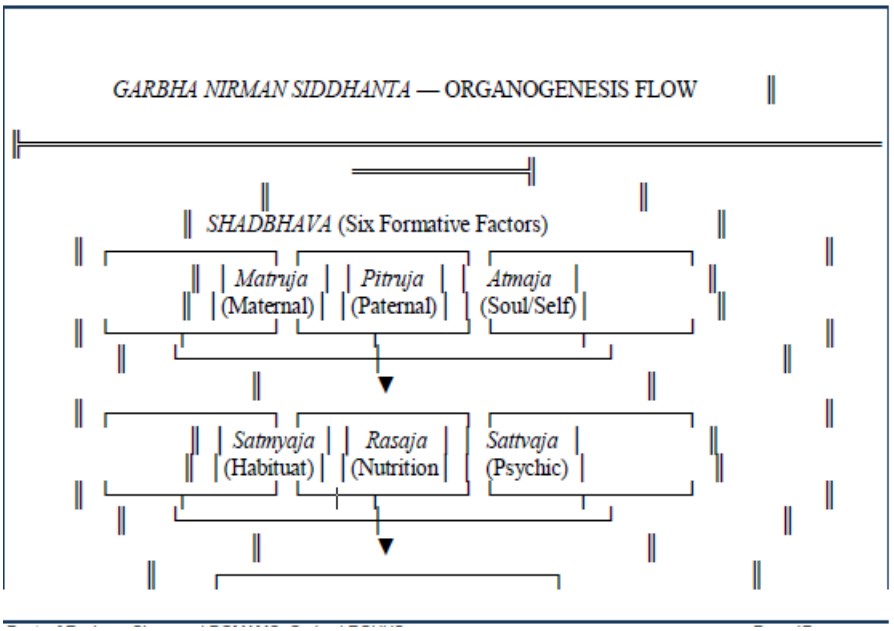
| Dosha / Sub-type | Classical Location & Function[1] | Modern Physiological Equivalent[12] | Disease when Vitiated |
|---|---|---|---|
| *Vyana Vata* | Resides in *Hridaya*; governs circulation, sweating, movement | Autonomic (sympathetic) nervous system; cardiovascular conduction; motor innervation | Hypertension, arrhythmia, neuromuscular disorders |
| *Prana Vata* | Resides in *Murdha* (head); governs respiration, swallowing, cognition | Brainstem respiratory centres; cranial nerve function; parasympathetic input | Asthma, epilepsy, cognitive decline |
| *Apana Vata* | Resides in *Pakwashaya/Basti*; governs downward movements, excretion | Sacral parasympathetics; colonic motility; urinary voiding reflex | IBS, constipation, urinary incontinence |
| *Pachaka Pitta* | Resides in *Amashaya-Pakwashaya* junction; digests food | HCl + pepsin secretion; pancreatic enzymes; bile salts | Hyperacidity, peptic ulcer |
| *Ranjaka Pitta* | Resides in *Yakrit-Pleeha*; imparts colour to *Rasa→Rakta* | Hepatic haem synthesis; bilirubin metabolism; erythropoiesis | Jaundice, anaemia, hepatitis |
| *Sadhaka Pitta* | Resides in *Hridaya*; governs intellect, emotion, memory | Neurotransmitter regulation (dopamine, serotonin); limbic system | Depression, psychosis, anxiety disorder |
| *Kledaka Kapha* | Resides in *Amashaya;* moistens and softens food | Mucus secretion; gastric protective lining; bicarbonate secretion | Gastric mucosal erosion; loss of protective barrier |
| *Avalambaka Kapha* | Resides in *Uras* (chest); supports heart and lungs | Pulmonary surfactant; pleural fluid; pericardial fluid; cardiac lubrication | Pleural effusion, pulmonary fibrosis, heart failure |
| *Tarpaka Kapha* | Resides in *Shiras* (head); nourishes sense organs | CSF (cerebrospinal fluid); intraocular fluid; endolymph | Sensory neuropathies, CNS degenerative diseases |

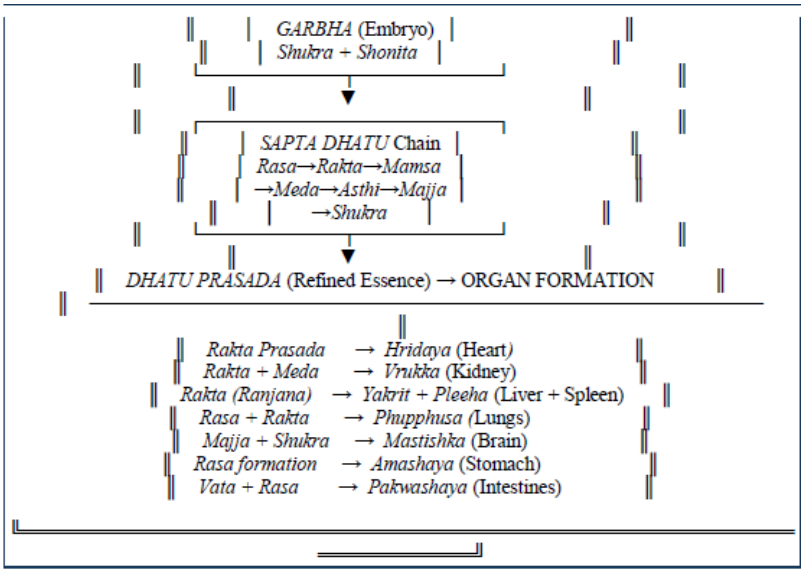
### 3.6 Diagram 1 — Ayurvedic Organogenesis Flow (*Garbha Nirman Siddhanta*)

Figure 1: Schema of organ formation from *Shadbhava* through *Dhatu-Prasada*. Each arrow represents the pathway from embryological precursor *(Bhava*) to *Dhatu* to Organ, governed by the corresponding *Dosha.*


Six Formative Factors:
Garbha
SAPTA DHATU Chain
Rasa
Rakta
Mamsa
Meda
Asthi
Majja
Shukra
DHATU PRASADA (Refined Essence) → ORGAN FORMATION
Rakta Prasada
Rakta + Meda
Rakta (Ranjana)
Rasa + Rakta
Majja + Shukra
Rasa formation
Vata + Rasa
Hridaya (Heart)
Vrukka (Kidney)
Yakrit + Pleeha (Liver + Spleen)
Phupphusa (Lungs)
Mastishka (Brain)
Amashaya (Stomach)
Pakwashaya (Intestines)

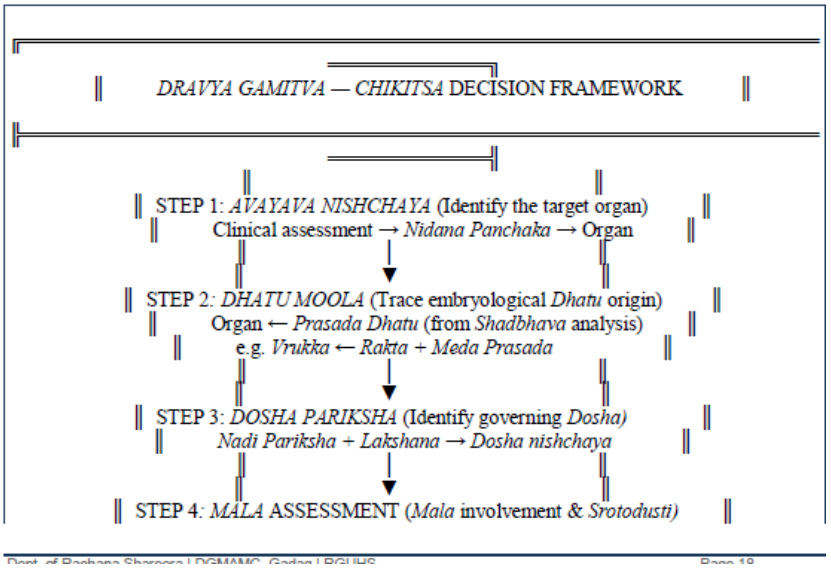

DRAVYA GAMITVA — CHIKITSA DECISION FRAMEWORK
STEP 1: AVAYAVA NISHCHAYA (Identify the target organ)
Clinical assessment → Nidana Panchaka → Organ
STEP 2: DHATU MOOLA (Trace embryological Dhatu origin)
Organ ← Prasada Dhatu (from Shadbhava analysis)
e.g., Vrukka ← Rakta + Meda Prasada
STEP 3: DOSHA PARIKSHA (Identify governing Dosha)
Nadi Pariksha + Lakshana → Dosha nishchaya
STEP 4: MALA ASSESSMENT (Mala involvement & Srotodusti)
Mutra/Purisha/Sweda → Sroto Vikara assessment
STEP 5: CHIKITSA SUTRA SELECTION
Dosha Shamana or Sroto Shodhana
Dhatu Poshana or Shodhana + Agni Deepana
STEP 6: DRAVYA SELECTION (Pharmacological Selection)
GAMITVA (Affinity)
PRATYATMA LAKSHANA (Unique action)
PRABHAVA (Specific Potency)
RESULT: Targeted Dravya + Anupana + Kala + Matra

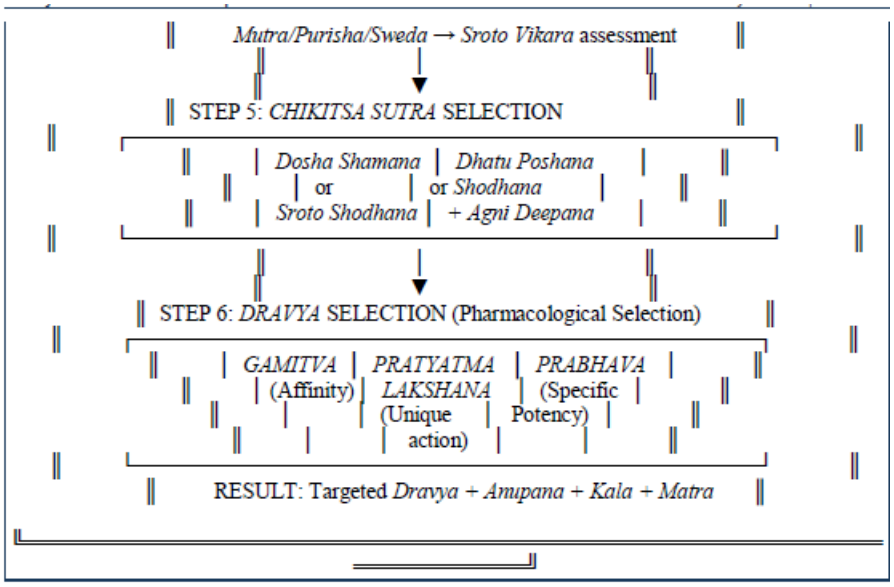

GARBHA NIRMAN SIDDHANTA — ORGANOGENESIS FLOW
SHADBHAVA (Six Formative Factors)
Matruja (Maternal)
Pitruja (Paternal)
Atmaja (Soul/Self)
Satmyaja (Habituat)
Rasaja (Nutrition
Sattvaja (Psychic)




**3.7 Diagram 2 — *Dravya Gamitva* Decision Framework (*Chikitsa* Flow)**

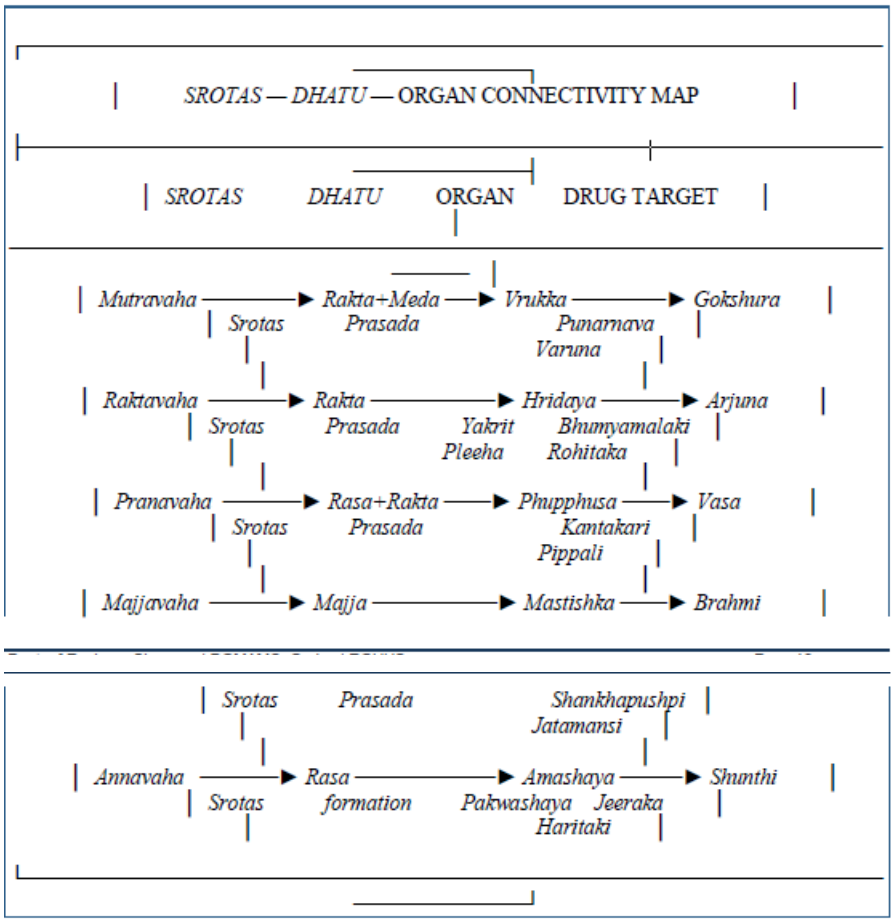
**Figure 2: Generalised six-step *Chikitsa Sutra* model for organ-specific Ayurvedic pharmacotherapy based on *Dravya Gamitva* and *Dhatu-Utpatti Siddhanta.***






### 3.8 Diagram 3 — *Srotas*-*Dhatu*-Organ Connectivity Map

**Figure 3: Network map showing the *Srotas* (channel systems) connecting *Dhatu* origin to organ function and drug targeting pathways in *Dravya Gamitva*.**



## IV. DISCUSSION

### 4.1 *Dhatu-Utpatti* and Modern Germ Layer Theory — A Critical Analysis

The correlation between Ayurvedic *Dhatu-Prasada* based organogenesis and modern germ layer derivation reveals a remarkably consistent conceptual parallelism, though the epistemological frameworks differ fundamentally. Modern embryology attributes organ formation to three germ layers — ectoderm, mesoderm, and endoderm — derived from the inner cell mass of the blastocyst.[11] Ayurveda attributes it to *Shadbhava* operating on the amalgamated essence of *Shukra-Shonita*, mediated by the transformative action of *Dhatvagni* on successive *Dhatu*.[1]

The correlation is strongest for mesodermal organs: the heart and kidney, both of which are derived from lateral plate and intermediate mesoderm respectively, correspond precisely to *Rakta-Prasada* origin in Ayurveda. *Rakta* (blood/vascular tissue) is intrinsically a mesoderm-equivalent concept — the circulatory system and its originating tissue.[211] This convergence is not coincidental: both systems, through independent lines of inquiry, arrived at a 'vascular/blood-like tissue' as the primordial origin of the pumping (heart) and filtering (kidney) organs of the circulatory system.

The correlation is moderate for endodermal organs (liver, lungs, gut). While *Ranjaka Pitta*'s seat in *Yakrit* (liver) and its function in *Rakta-ranjana* aligns functionally with hepatic haem synthesis and bilirubin metabolism,[12] the developmental origin (endoderm) does not map neatly to *Rakta Dhatu*. This suggests that Ayurvedic *Dhatu* classification is fundamentally functional-physiological rather than strictly embryological — a distinction that strengthens rather than weakens the intellectual framework, as it implies a systems biology approach.[14]

### 4.2 *Dravya Gamitva* — A Pre-Modern Drug-Receptor Theory?

The tripartite model of *Gamitva* + *Pratyatma Lakshana* + *Prabhava* exhibits structural homology with modern pharmacological theory. *Gamitva* corresponds to pharmacokinetic organ distribution (volume of distribution, protein binding, transporter-mediated uptake). *Pratyatma Lakshana* corresponds to the primary pharmacodynamic action (receptor agonism/antagonism, enzyme inhibition). *Prabhava* corresponds to pleiotropic or idiosyncratic mechanisms that transcend primary receptor action.[313]

Emerging phytopharmacological research supports several classical *Prabhava* claims: *Punarnava's* (*Boerhavia diffusa*) specific anti-oedema effect has been attributed to

modulation of aquaporin-2 expression in renal collecting ducts — a mechanism not predictable from its *Rasa-Guna-Virya* profile alone.[15] Similarly, *Arjuna*'s cardiac-specific effect has been linked to L-type calcium channel modulation and antioxidant protection of myocardial mitochondria.[16]

### 4.3 *Srotas* vs. Organ System — Conceptual Depth

A critical contribution of this review is the clarification that Ayurvedic *Srotas* does not map simplistically to a single anatomical organ but to a functional channel system encompassing organ + vascular supply + neural innervation + secretory pathway. The *Mutravaha Srotas*, for instance, encompasses kidney parenchyma, ureters, bladder, and the fluid-regulatory neuroendocrine axis — an integrative systems concept that aligns with modern nephrology's recognition that renal disease is a disorder of the entire volume-regulatory system.[512]

## V. CLINICAL TRIAL PROTOCOL

**Validation of *Dravya Gamitva* Principle in *Vrukka Roga*: A Randomised Controlled Trial**

### 5.1 Study Title

**A Randomised, Double-Blind, Placebo-Controlled Phase II Clinical Trial to Evaluate the Efficacy and Safety of a *Mutravaha Srotas*-Targeted Ayurvedic Formulation (*Gokshura-Punarnava-Varuna* Compound) in Chronic Kidney Disease Stage 2–3 (*Vrukka Vikara*) Based on the *Dravya Gamitva* Principle.**

### 5.2 Study Rationale

The selection of *Vrukka Roga* as the index disease for this protocol is based on: (1) the most explicit classical evidence for organ-specific *Dhatu* origin *(Rakta + Meda Prasada → Vrukka*);[2] (2) availability of well-validated modern biomarkers (serum creatinine, eGFR, proteinuria); (3) documented in vitro and in vivo pharmacological data for the selected *Dravyas*; and (4) the unmet need for evidence-based Ayurvedic interventions in CKD stages 2–3 where modern nephrology offers only progression-slowing strategies.

### 5.3 Study Objectives Primary Objective

- To evaluate the efficacy of *Gokshura-Punarnava-Varuna* compound (GoPuVa) in improving eGFR (estimated Glomerular Filtration Rate) over 12 weeks in patients with CKD Stage 2–3 compared to placebo.

**Secondary Objectives**

- To assess the effect on 24-hour urinary protein excretion
- To assess serum creatinine, BUN (Blood Urea Nitrogen), and uric acid levels
- To evaluate Ayurvedic *Vrukka Vikara* assessment scale (*Mutra Pariksha, Nadi Pariksha, Prakruti* assessment)
- To assess quality of life using SF-36 questionnaire and *Ayurveda* Quality of Life Scale (AyurQoL)
- To evaluate safety through LFTs, CBC, and adverse event monitoring

### 5.4 Study Design

| Parameter | Details |
|---|---|
| Study Type | Randomised, Double-Blind, Placebo-Controlled, Parallel-Group Clinical Trial |

| Parameter | Details |
|---|---|
| Phase | Phase II (Exploratory efficacy + safety) |
| Duration | 12 weeks of intervention + 4 weeks follow-up = 16 weeks total |
| Setting | Outpatient Department, Shri D.G.M. Ayurvedic Medical College & Hospital, Gadag |
| Sponsor | Departmental Research Grant / CCRAS / Institutional Research Committee |
| Registration | CTRI (Clinical Trials Registry — India): www.ctri.nic.in [Registration number to be obtained] |
| Ethics Approval | Institutional Ethics Committee (IEC), DGMAMC, Gadag — Protocol No.: [to be assigned] |
| Sample Size | 60 participants (30 per arm) — based on 80% power, α=0.05, expected eGFR improvement of 15% (SD=20%) |
| Allocation Ratio | 1:1 (Intervention : Placebo) |
| Randomisation | Computer-generated block randomisation (block size 4); allocation concealment by sealed opaque envelopes |
| Blinding | Double-blind: participants and outcome assessors blinded; treating physician not blinded (open-label treatment arm administrator) |

### 5.5 Study Population Inclusion Criteria

- Adults aged 18–65 years of either sex
- Diagnosed with CKD Stage 2 (eGFR 60–89 mL/min/1.73m²) or Stage 3 (eGFR 30–59 mL/min/1.73m²) per KDIGO 2022 guidelines
- Persistent proteinuria (urine ACR > 30 mg/g on two readings 3 months apart)
- Ayurvedic diagnosis of *Vrukka Vikara* with *Mutravaha Srotodushti* (confirmed by *Nadi Pariksha* and *Mutra Pariksha*)
- Willing to provide written informed consent
- Able to comply with study schedule and refrain from concurrent nephrotoxic drugs

**Exclusion Criteria**

- CKD Stage 4–5 (eGFR < 30 mL/min/1.73m²) or on renal replacement therapy
- Diabetes mellitus Type 1 or uncontrolled Type 2 (HbA1c > 9%)
- Autoimmune renal disease (SLE nephritis, ANCA-associated vasculitis)
- Pregnancy, lactation, or planning pregnancy
- Hepatic impairment (SGPT/SGOT > 3x ULN)
- Known hypersensitivity to any study drug ingredient
- Use of any other Ayurvedic, herbal, or investigational drug within 30 days of enrolment

### 5.6 Intervention

| Arm | Drug | Composition | Dose | Route | Frequency | Duration |
|---|---|---|---|---|---|---|
| Intervention | GoPuVa Compound | *Gokshura* (*T. terrestris*) 250 mg + *Punarnava* (*B. diffusa*) 250 mg + *Varuna* (*C. nurvala*) 250 mg (standardised extract, 5:1) | 2 capsules (750 mg/capsule) | Oral | Twice daily after meals with warm water | 12 weeks |
| Control | Placebo | Microcrystalline cellulose + caramel colour (identical appearance) | 2 capsules | Oral | Twice daily after meals | 12 weeks |

Drug standardisation: All extracts will be standardised to marker compounds — *Gokshura* to furostanolic saponins (≥2%), *Punarnava* to punarnavoside (≥0.8%), *Varuna* to lupeol (≥0.5%). HPTLC fingerprinting and heavy metal testing (as per Ayurvedic Pharmacopoeia of India standards) will be mandatory.[17]

### 5.7 Outcome Measures

| Outcome | Measure | Assessment Tool | Timepoint |
|---|---|---|---|
| Primary | Change in eGFR from baseline | CKD-EPI 2021 equation (serum creatinine + cystatin C) | Baseline, Week 6, Week 12, Week 16 (follow-up) |
| Secondary 1 | 24-hour urinary protein excretion | Urine ACR (albumin-creatinine ratio) | Baseline, Week 6, Week 12 |
| Secondary 2 | Serum creatinine, BUN, uric acid | Automated biochemical analyser (NABL-accredited lab) | Baseline, Week 6, Week 12 |
| Secondary 3 | Ayurvedic disease severity | Custom Vrukka Vikara Assessment Scale (VVAS) — Nadi, | Baseline, Week 4, Week 8, Week 12 |

| Outcome | Measure | Assessment Tool | Timepoint |
|---|---|---|---|
| | | Mutra, Symptoms (0–30 scale, validated) | |
| Secondary 4 | Quality of Life | SF-36 v2 + AyurQoL Scale (validated) | Baseline, Week 12 |
| Safety | Adverse events, hepatotoxicity, haematological | SGPT, SGOT, CBC, ECG, AE diary | Every 4 weeks + as needed |

### 5.8 Statistical Analysis Plan

- Primary analysis: Intention-to-treat (ITT) analysis; per-protocol (PP) analysis as sensitivity analysis
- Continuous variables: Paired t-test (within group) or Wilcoxon signed-rank test (if non-normal); unpaired t-test or Mann-Whitney U (between groups)
- Categorical variables: Chi-square test or Fisher's exact test
- Effect size: Cohen's d; 95% Confidence Intervals reported for all estimates
- Missing data: Multiple imputation using MICE algorithm
- Significance level: $\alpha = 0.05$ (two-tailed); $p < 0.05$ considered statistically significant
- Software: SPSS v26.0 (IBM) or R v4.3.0

### 5.9 Ayurvedic Assessment Protocol (Nidana Panchaka for Vrukka Roga)

| Assessment Parameter | Classical Tool | Specific Findings Expected in *Vrukka Vikara* | Assessment Frequency |
|---|---|---|---|
| *Nidana* (Causative factors) | History — *Ahara/Vihara/Manasika* | Excessive *Lavana-Amla, Abhishyandi* foods, sedentary habits, chronic *Chinta* | Baseline only |
| *Purvarupa* (Prodromal features) | Direct inquiry (symptom checklist) | *Mutra daurbalya, Padartha Shotha*, mild | Baseline |

| Assessment Parameter | Classical Tool | Specific Findings Expected in *Vrukka Vikara* | Assessment Frequency |
|---|---|---|---|
| | | *Klama, Bhrama* | |
| *Rupa* (Cardinal symptoms) | *Vrukka Vikara* Assessment Scale (VVAS) | *Mutra krichra, Shotha, Avila Mutra, Shrama, Prishtha Shoola* | Every 4 weeks |
| *Upashaya/Anupashaya* | Drug/diet response | Relief with *Mutrala* herbs; aggravation with *Ruksha* diet | Every 4 weeks |
| *Samprapti* (Pathogenesis) | *Nadi Pariksha, Mutra Pariksha* | *Vata-Kapha* in *Mutravaha Srotas; Pitta* component (haematuria if present) | Baseline, Week 12 |

| | | | |
|---|---|---|---|
| Nadi Pariksha | Expert Vaidya assessment | *Kapha-Pitta Nadi* dominance at *Vrukka* marma site | Baseline, Week 6, Week 12 |
| Mutra Pariksha (classical) | Colour, odour, foam, sedimentation — Taila bindu pariksha | *Avila* (turbid), *Phenila* (foamy), *Alpa Mutra* | Baseline, Week 6, Week 12 |

### 5.10 Ethical Considerations

- The study will be conducted in accordance with the Declaration of Helsinki (2013), ICMR National Ethical Guidelines for Biomedical Research (2017), and Good Clinical Practice (GCP) guidelines of CDSCO, India.
- Written informed consent will be obtained in the participant's preferred language (Kannada/English/Hindi). Consent includes right to withdraw at any time without penalty.
- All participants in the placebo arm will be offered the active treatment at the end of the trial if proven efficacious (compassionate use provision).
- Personal data will be pseudonymised; stored securely for 7 years post-trial per ICMR guidelines.
- Independent Data Safety Monitoring Board (DSMB) will review interim safety data at 6 weeks.

## VI. CONCLUSION

This comprehensive literary review demonstrates that Ayurvedic organ-specific pharmacotherapy (*Chikitsa Sutra*) is neither empirical nor arbitrary, but is grounded in a coherent, internally consistent framework derived from *Dhatu-Utpatti Siddhanta* and expressed through the principle of *Dravya Gamitva*. The classical texts of the *Brihatrayee* — Charaka Samhita, Sushruta Samhita, and Ashtanga Hridayam — provide detailed, mutually reinforcing accounts of organ formation from *Dhatu-Prasada*, *Dosha* governance, and *Srotas*-mediated drug delivery.[125]

The comparative analysis presented in Tables 5–7 reveals that despite differences in terminology and epistemological traditions, Ayurvedic organogenesis and modern embryology converge on several fundamental insights: the primacy of 'blood/vascular tissue' in forming the circulatory organs, the role of neural-specific tissue *(Majja*) in brain formation, and the functional-channel-based (*Srotas*) conceptualisation of organ systems. The tripartite *Dravya Siddhanta (Gamitva + Pratyatma Lakshana + Prabhava)* demonstrates structural homology with modern target-based pharmacology.[313]

The clinical trial protocol designed herein for *Vrukka Roga* offers a rigorous, ethically sound, and methodologically robust pathway to generate Level I evidence for the *Dravya Gamitva* principle in a specific clinical context. Should this protocol demonstrate efficacy, it will lay the groundwork for a generalised, organ-by-organ evidence base for Ayurvedic organ-specific pharmacotherapy — a contribution of immense significance for both traditional medicine and integrative healthcare.

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For correspondence: Department of Rachana Shareera, Shri D.G.M. Ayurvedic Medical College & Hospital, Gadag — 582103, Karnataka, India.