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A Systematic Review On The Concept Of *Srotas*: Structural And Functional Perspectives In *Ayurveda* And Modern Science

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Abstract

The *Ayurvedic* concept of ***Srotas***—networks of transport and communication channels—is foundational to understanding the physiology and pathology of the human body. These channels are responsible for the movement of *Doshas*, *Dhatus*, *Malas*, and vital life forces. While *Ayurveda* approaches the body through a functional and energetic lens, modern medicine relies on observable anatomical and biochemical systems. This systematic review bridges traditional *Ayurvedic* teachings with modern anatomical and physiological science, offering a holistic view of the structure and function of *Srotas*. By exploring classical texts and integrating contemporary research, this article proposes anatomical analogies and therapeutic insights that reflect both systems.

Keywords: *Srotas*, *Srotomaya Sharira*, *Ayurveda*, *Dhatu*, *Dosha*, Pathophysiology, Integrative Medicine, Body Channels

1. Introduction

Ayurveda perceives the human body as a complex network of interconnected systems governed by ***Tridosha*** *(Vata, Pitta, Kapha),* ***Sapta Dhatus***, and ***Malas***, all of which are regulated through ***Srotas***—structural and functional channels. The term "*Srotas*" is derived from the Sanskrit root "√sru", meaning *to flow*, symbolizing the continuous flow of bodily substances essential for life.

Classical texts such as ***Charaka Samhita***, ***Sushruta Samhita***, and ***Ashtanga Hridaya*** elaborate on multiple types of *Srotas*, their origins, pathways, dysfunctions (*Srotodushti*), and management. In contrast, modern anatomy discusses organs and systems such as the cardiovascular system, lymphatic's, neural networks, and ductal systems which perform similar transport and communication functions.

This article explores *Srotas* in a comparative framework, focusing on:

- Structural identification of *Srotas*
- Functional mechanisms
- Pathophysiological implications of *Srotodushti*
- Analogous systems in modern science
- Therapeutic perspectives of restoring *Srotas* health

2. Objectives

- To systematically review classical *Ayurvedic* concepts of *Srotas*.
- To correlate *Ayurvedic Srotas* with modern anatomical and physiological systems.
- To explore clinical implications and therapeutic applications.

3. Methodology

Type of Study

Systematic Review based on qualitative comparative analysis.

Sources

- **Primary *Ayurvedic* Sources**:
  - *Charaka Samhita* (Sutrasthana 30, Vimanastana 5)
  - *Sushruta Samhita* (Sharirasthana 9)
  - *Ashtanga Hridaya*

- **Commentaries**: *Chakrapani, Dalhana, Arundatta*
- **Modern Textbooks**:
    - Guyton and Hall's Textbook of Medical Physiology
    - Gray's Anatomy
    - Human Physiology by Laura lee Sherwood
- **Research Databases**: PubMed, Scopus, AYUSH Research Portal, Google Scholar

Inclusion Criteria

- Peer-reviewed articles (2000–2024)
- Comparative physiology and anatomy
- Texts elaborating on Ayurveda–modern medicine correlation

Exclusion Criteria

- Articles lacking physiological or anatomical focus
- Non-translated regional studies
- Animal models without human correlates

4. Review of Literature

4.1 General Definition of *Srotas*

"*Shariram Srotomayam*" – *Charaka Samhita*

The body is constituted of innumerable channels.

Srotas refers to a system of bodily channels through which various substances like air (*Prana*), food (*Anna*), water (*Udaka*), blood (*Rakta*), and waste materials (*Mutra, Purisha, Sweda*) flow and interact. Structurally, they may be **gross (*sthula*)** like blood vessels, or **subtle (*sukshma*)** like nutrient pathways at the cellular level.

4.2 *Ayurvedic* Classification of *Srotas*

Charaka describes **13 pairs of *Srotas***, each governed by a ***Moola*** (origin), ***Marga*** (path), and ***Mukha*** (outlet). *Sushruta* elaborates similarly, with additional surgical and pathological relevance.

Table 1: Classical List of Major *Srotas* and Their Functions

No	*Srotas* Name	Function	*Moola* (Origin)	*Marga* (Pathway)	*Mukha* (Outlet)
1	*Pranavaha*	Respiration, Prana movement	*Hridaya, Mahasrotas*	Respiratory tract	Nose and lungs
2	*Annavaha*	Digestion, nutrient transport	*Amasaya, Annavahini Dhamani*	GI tract	Intestines
3	*Udakavaha*	Water metabolism, thirst	*Talu, Kloma*	Oro-pharyngeal area	Sweat, salivation
4	*Raktavaha*	Blood transport	*Yakrit, Pleeha*	Arteries and veins	Capillaries, tissues
5	*Mamsavaha*	Muscle nutrition	*Snayu, Tvak*	Muscular pathways	Peripheral tissues
6	*Medovaha*	Fat metabolism	*Kati, Vrikka*	Lymphatics, fat tissue	Adipose sites
7	*Asthivaha*	Bone tissue nourishment	*Sandhi, Asthi*	Bone channels	Joint capsules
8	*Majjavaha*	Marrow and nerve conduction	*Asthi, Sandhi*	Nerve tracts	Neural junctions
9	*Shukravaha*	Reproductive fluid (male)	*Vrishana, Stana*	Seminal ducts	Urethra
10	*Artavavaha*	Reproductive fluid	*Garbhashaya, Artavavahi*	Uterine tubes	Vagina

		(female)	*Dhamani*		
11	*Mutravaha*	Urine formation and flow	*Vasti, Medhra*	Ureters and urethra	External urethral meatus
12	*Purishavaha*	Fecal transport	*Pakwashaya, Sthulantra*	Large intestine	Anus
13	*Swedavaha*	Sweat excretion	*Romakupa, Tvak*	Skin ducts	Sweat glands

4.3 Structural Perspective of *Srotas*

Srotas are often microscopic and subtle, resembling capillary networks, ducts, lymphatic vessels, and even **interstitial pathways** now discovered in modern science (e.g., glymphatic system, interstitium).

Table 2: Structural Comparison of *Ayurvedic* and Modern Channels

Ayurvedic Structure	Described As	Modern Equivalent
Srotas	Channels or transport paths	Blood vessels, ducts, nerves
Dhamani	Pulsatile vessels	Arteries
Sira	Non-pulsatile vessels	Veins
Moola of Srotas	Originating organ/tissue	Primary structure (e.g., heart for blood)
Sukshma Srotas	Microscopic channels	Capillaries, lymphatics, axonal pathways

4.4 Functional Perspective of *Srotas*

Functions of *Srotas* go beyond physical transport. They reflect **dynamic balance** (*Samyavastha*) essential for health. Obstruction or vitiation (*Srotodushti*) leads to disease.

Table 3: Functional Mapping of *Srotas* with Modern Physiology

Srotas Type	Ayurvedic Function	Modern Correlate
Pranavaha	Prana movement, respiration	Pulmonary ventilation
Raktavaha	Blood distribution	Circulatory system
Udakavaha	Water balance	Thirst mechanism, osmoregulation
Annavah	Digestion	GI tract and enzymatic breakdown
Majjavaha	Nerve conduction	CNS, PNS (spinal cord, neurons)

5. Pathophysiology of *Srotas* (*Srotodushti)*

Ayurveda classifies Srotodushti into:

- ***Sanga****:* Obstruction (e.g., atherosclerosis, constipation)
- ***Atipravrutti***: Excess flow (e.g., diarrhea, hyperhidrosis)
- ***Sira Granthi***: Channel swelling (e.g., tumors, lymphadenopathy)
- ***Vimarga gamana***: Misrouted flow (e.g., fistulas, retrograde flow)

Each dysfunction relates to modern disease states like:

- Cardiovascular disorders
- Hormonal dysregulation
- Neurological deficits
- Gastrointestinal syndromes

6. Therapeutic Importance

Ayurvedic treatments focus on:

- ***Srotoshodhana*** (channel purification)
- ***Panchakarma***: *Vamana, Virechana, Basti, Nasya, Raktamokshana*
- ***Rasayana* Therapy** for *Srotas* regeneration
- ***Srotogamitva*** (targeted drug delivery through *Srotas*)

Herbs like ***Triphala, Guggulu, Punarnava***, and formulations like ***Kanchanara Guggulu*** are known for their ***Srotoshodhaka*** properties.

7. Conclusion

The *Ayurvedic* understanding of ***Srotas*** embodies a functional, holistic approach to human physiology, recognizing the essential role of channels in maintaining health. Modern science, with its structural lens, identifies these systems anatomically. The two systems, when viewed complementarily, offer a deeper understanding of bodily communication and regulation. Future interdisciplinary studies should further validate *Srotas* through imaging, histopathology, and systems biology.

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