



SROTAS: AN AYURVEDIC PERSPECTIVE ON THE BODY'S CHANNELS AND THEIR FUNCTIONS

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ABSTRACT

This study delves into the Ayurvedic concept of *Srotas*, which are the intricate channels within the human body that facilitate the flow of vital substances, including *Doshas* (Bio-energetic forces), *Dhatus* (Tissues), *Malas* (Waste products), and toxins. By examining classical Ayurvedic texts and correlating these with modern anatomical structures, the research highlights the pivotal role *Srotas* play in maintaining physiological balance and supporting overall health. The study also explores the functional and anatomical significance of *Srotas* in the transportation of essential elements like *Prana* (Life force), *Anna* (Food), and *Vari* (Water). Through this exploration, the paper aims to enhance the understanding of how disruptions in these channels can lead to various diseases, emphasizing the importance of maintaining the integrity of *Srotas* for optimal health.

KEYWORDS: Srotas, Ayurveda, Doshas, Dhatus, Physiological Channels.

INTRODUCTION

Ayurveda describes the human body as a network of countless channels known as *Srotas*, which are vital for performing various physiological functions.^[01] The *Doshas* (Bio-energetic forces) and *Dhatus* (Tissues) carry out their roles within the body through these *Srotas*, which also facilitate the elimination of *Mala* (Waste products) and toxins.^[02] The *Avayavas* (Organs) are associated with these minute channels, which support each organ's function by ensuring proper flow and transportation within the body.^[03] The term *Srotas* is derived from the word "Susravana," meaning exudation, oozing, and filtering, reflecting their crucial role in the flow of substances. These channels are essential for the distribution of nutrients, tissue building, and detoxification.^[04]

Acharya Sushruta emphasized that *Srotas* are responsible for transporting *Prana* (life force), *Anna* (food), *Vari* (water), and *Dhatus* within the body.^[05] These pathways are governed by *Vayu* (the air element), playing a significant role in the body's physiological processes. Various anatomical structures, such as veins, arteries, lymphatic ducts, capillaries, body orifices, and ducts,

perform functions similar to *Srotas*, leading classical Ayurvedic texts to describe them as synonyms for *Srotas*.^[06]

The *Srotas* are described as *Sthula* (gross), *Anu* (minute), *Vrutta* (round), *Deergha* (long), and *Pratanasadrusha* (branching) in nature, with their color often resembling the substances they transport. *Acharya Vagbhata* categorizes *Srotas* into two types: *Sthula Srotas* (perceptible) and *Sukshma Srotas* (imperceptible). *Acharya Charaka* further explains that biochemical molecules undergoing metabolic processes are held and carried through these *Srotas*. These channels serve as functional pathways for *Prasadhakya* (nutrient-carrying) and *Malakhya* (waste-carrying) molecules, making them crucial for maintaining the supply of essential nutrients and the elimination of waste from the body.^[07,08]

Need of study

This study is needed to deepen the understanding of *Srotas* in Ayurveda, highlighting their vital role in maintaining physiological balance, and to explore their correlation with modern anatomical structures.

MATERIAL AND METHODS

स्रोतोमूलं रसस्याहुः हृदयमाशयं तथा।

तस्य वाग्ग्रहनं दैवमनुगच्छेत सादरः ॥

Charaka Samhita, Vimanasthana 5/3

Definition and Origin

स्रोतो नाम नाडीमुखं येनासृज्यते द्रवः।

विनिष्पद्यन्ति येन च धातवः परिणामतः ॥

Charaka Samhita, Vimanasthana 5/11

The term "Srotas" refers to the channels through which fluids flow and through which the transformed bodily tissues (Dhatu) are produced and nourished. This verse highlights that Srotas are the pathways in the body that facilitate the transport and transformation of bodily substances.

- The term *Srotas* is derived from "Susravana," meaning exudation, oozing, or filtering. It refers to the channels or pathways in the body through which substances flow.
- *Srotas* are fundamental to the body's structure, facilitating the transport of vital elements like *Doshas*, *Dhatu*, *Malas*, nutrients, and toxins.

Types of srotas

- *Srotas* are categorized into *Sthula Srotas* (Gross, visible channels) and *Sukshma Srotas* (Minute, imperceptible channels).
- Examples include *Pranavaha Srotas* (Respiratory channels), *Udakavaha Srotas* (Water channels), *Raktavaha Srotas* (Blood channels), *Mutravaha Srotas* (Urinary channels), *Anna Vaha Srotas* (Nutrient channels), *Rasa Vaha Srotas* (Plasma channels), and *Sukra Vaha/Artava Vaha Srotas* (Reproductive channels).

Physiological functions

- *Srotas* are responsible for the transportation and distribution of essential substances within the body, such as nutrients, oxygen (*Prana*), and metabolic products.
- They aid in the absorption, assimilation, and diffusion of bio-molecules and drugs.
- *Srotas* support tissue nourishment (*Dhatu poshana*) by transporting nutrients derived from *Aahara rasa* (essence of food).
- They help in the elimination of waste products (*Mala*) and toxins, thus preventing conditions like edema and maintaining homeostasis.

Structural characteristics

- The gross nature of *Srotas* enables them to carry out bulk biochemical processes, while their microscopic nature allows for the transportation of small molecules and facilitates absorption and diffusion.
- Their round shape helps in retaining substances, while the elongated shape provides directional transportation within the body.

Clinical Aspects and Pathology

- Disturbances in *Srotas* can manifest as various pathological conditions, including:
 - *Atipravritti* (excessive flow through *Srotas*)
 - *Sanga* (obstruction or retention of substances within *Srotas*)
 - *Sira Granthi* (dilatation of veins)
 - *Vimarg gaman* (abnormal flow of substances in an unintended direction)
- Such disturbances can lead to the aggravation of *Doshas* and contribute to the development of diseases.

Importance of srotas in health

- Healthy *Srotas* are essential for maintaining physiological balance and overall well-being.
- They play a crucial role in metabolic transformation, regulate enzyme activity, maintain electrolyte balance, and support the body's defense mechanisms by facilitating the transportation of antibodies.

Role in therapeutic processes

- *Srotas* are integral to the success of *Samsodhana* (detoxification therapies) in Ayurveda, as effective elimination of waste is only possible when *Srotas* are in a healthy state.
- They also aid in *Pachana* (digestion), diffusion of nutrients, and biotransformation processes.

Specific functions of different srotas^[08,09,10]

In Ayurveda, the concept of *Srotas* refers to channels or pathways in the body responsible for transporting various substances, including nutrients, waste products, and life force. These ancient concepts can be compared with modern physiological systems to better understand their functions from both Ayurvedic and contemporary medical perspectives. Below is an explanation of each *Srotas* and its comparison with modern physiological concepts:

1. Pranavaha srotas

• Ayurvedic concept

- These channels are responsible for carrying *Prana* (vital breath or life force) throughout the body, supporting respiration and maintaining life.

• Modern science comparison

- This can be compared to the respiratory system, including the lungs, bronchi, trachea, and diaphragm, which are involved in the intake of oxygen and the expulsion of carbon dioxide.

• Clinical application

- In Ayurveda, disorders of *Pranavaha Srotas* are linked to respiratory conditions such as asthma, bronchitis, and dyspnea. Treatment may involve *Pranayama* (Breathing exercises), herbal remedies, and *Rasayana* therapy to strengthen respiratory function.

2. Udakavaha srotas

- **Ayurvedic concept**
 - These channels transport *Udaka* (Water and Fluids) within the body, maintaining hydration and fluid balance.
- **Modern science comparison**
 - This corresponds to the body's fluid regulation systems, including the lymphatic system, circulatory system (plasma), and renal system (Kidneys, ureters).
- **Clinical application**
 - Disorders of *Udakavaha Srotas* may manifest as dehydration, edema, or fluid imbalances. Ayurvedic treatment focuses on balancing hydration through dietary adjustments, proper water intake, and diuretics like herbal formulations.

3. Raktavaha srotas

- **Ayurvedic concept**
 - These channels are responsible for the circulation of *Rakta* (blood), which nourishes and sustains the tissues by transporting oxygen and nutrients.
- **Modern science comparison**
 - This directly parallels the cardiovascular system, including the heart, arteries, veins, and capillaries, which circulate blood throughout the body.
- **Clinical application**
 - In Ayurveda, disorders like anemia, hypertension, or circulatory issues are treated by addressing imbalances in *Raktavaha Srotas* through blood-purifying herbs, dietary modifications, and therapies like bloodletting (*Raktamokshana*).

4. Mamsavaha srotas

- **Ayurvedic concept**
 - These channels transport and nourish *Mamsa* (Muscle tissue), supporting physical strength and structure.
- **Modern science comparison**
 - This can be compared to the musculoskeletal system, which includes muscles, tendons, and the associated nervous supply responsible for movement and strength.
- **Clinical application**
 - Muscular dystrophy, myopathy, or general muscle weakness may be linked to disturbances in *Mamsavaha Srotas*. Treatment includes massages with medicated oils (*Abhyanga*), physical therapies, and strengthening herbs.

5. Medovaha srotas

- **Ayurvedic concept**
 - These channels are responsible for the transportation and metabolism of *Meda* (Fat tissue), providing energy storage and insulation.
- **Modern science comparison**
 - This corresponds to the adipose tissue and the endocrine system involved in fat storage and metabolism, including the role of hormones like insulin and leptin.

- **Clinical application**

- Obesity, hyperlipidemia, and metabolic disorders are seen as imbalances in *Medovaha Srotas*. Ayurvedic approaches involve lifestyle changes, dietary restrictions, exercise, and herbs that promote fat metabolism like *Guggulu* and *Triphala*.

6. Asthivaha srotas

- **Ayurvedic concept**
 - These channels nourish and maintain *Asthi* (Bone tissue), providing structural support to the body.
- **Modern science comparison**
 - This aligns with the skeletal system, including bones, cartilage, and joints, which form the body's framework and protect organs.
- **Clinical application**
 - Conditions like osteoporosis, arthritis, and fractures are linked to *Asthivaha Srotas* disturbances. Ayurvedic treatments include calcium-rich herbs, *Basti* therapy (Enemas), and dietary changes to strengthen bones.

7. Majjavaha srotas

- **Ayurvedic concept**
 - These channels are responsible for the nourishment of *Majja* (Marrow and Nervous tissue), which is crucial for blood formation and nervous system function.
- **Modern science comparison**
 - This corresponds to bone marrow (Hematopoiesis) and the central nervous system, including the brain and spinal cord.
- **Clinical application**
 - Neurological disorders, anemia, and immune deficiencies are treated by addressing *Majjavaha Srotas* with nervine tonics, Rasayana therapies, and supportive diet.

8. Shukravaha srotas

- **Ayurvedic concept**
 - These channels handle the production and transportation of *Shukra* (Reproductive tissue/semen), vital for reproduction and vitality.
- **Modern science comparison**
 - This corresponds to the male reproductive system, including the testes, seminal vesicles, and associated endocrine glands.
- **Clinical application**
 - Issues like infertility, low sperm count, and sexual dysfunction are treated through strengthening herbs like *Ashwagandha* and *Shatavari*, along with lifestyle changes and Panchakarma therapies.

9. Artavavaha srotas

- **Ayurvedic concept**
 - These channels govern the flow and regulation of *Artava* (Menstrual Fluid and Female reproductive elements).
- **Modern science comparison**

- This aligns with the female reproductive system, including the ovaries, uterus, and hormonal regulation of the menstrual cycle.
- **Clinical application**
- Menstrual disorders, PCOS, and infertility are treated by balancing *Artavavaha Srotas* with herbs, *Nasya* (Nasal administration), and *Yoni Pichu* (Vaginal tampon soaked in medicated oil).

10. Mutravaha srotas

- **Ayurvedic concept**
- These channels manage the formation, transportation, and excretion of *Mutra* (Urine).
- **Modern science comparison**
- This corresponds to the urinary system, including kidneys, ureters, bladder, and urethra, which filter blood and remove waste.
- **Clinical application**
- Urinary tract infections, kidney stones, and fluid retention are linked to *Mutravaha Srotas* imbalances. Treatments include diuretics, herbs like *Punarnava* and *Gokshura*, and therapies like *Uttara Basti*.

11. Purishavaha srotas

- **Ayurvedic concept**
- These channels are responsible for the transportation and excretion of *Purisha* (Feces).
- **Modern science comparison**
- This aligns with the lower gastrointestinal tract, particularly the colon, rectum, and anus, which are involved in the expulsion of solid waste.
- **Clinical application**
- Constipation, hemorrhoids, and irritable bowel syndrome are treated by balancing *Purishavaha Srotas* with dietary fiber, herbal laxatives, and enemas.

12. Swedavaha srotas

- **Ayurvedic concept**
- These channels manage the production and excretion of *Sweda* (Sweat), important for thermoregulation and detoxification.
- **Modern science comparison**
- This corresponds to the sweat glands in the integumentary system, which help regulate body temperature and eliminate waste through perspiration.
- **Clinical application**
- Disorders like excessive sweating, anhidrosis (Lack of sweating), and skin conditions are treated by addressing *Swedavaha Srotas* with therapies like *Swedana* (Sudation therapy), herbal baths, and detoxification.

13. Manovaha srotas

- **Ayurvedic concept**
- These channels govern mental functions, including thought processes, emotions, and cognition.

- **Modern science comparison**

- This aligns with the central nervous system, particularly the brain, along with the neuroendocrine system, which regulates mood, emotions, and mental health.

- **Clinical application**

- Psychological disorders, stress, and cognitive issues are treated by balancing *Manovaha Srotas* with meditation, *Rasayana* therapies, adaptogenic herbs like *Brahmi*, and counseling.

DISCUSSION

The concept of *Srotas* in Ayurveda provides a profound understanding of the body's physiological functions and their pathways. As described in classical Ayurvedic texts, *Srotas* are not merely physical channels but also include subtle pathways that facilitate the flow of various *Doshas* (biological energies), *Dhatus* (tissues), and *Malas* (waste products). Our study delves into the comprehensive role of these channels in maintaining health and preventing disease, which is integral to the Ayurvedic understanding of the human body.

Comparison with modern physiology

In modern medical science, the functions attributed to *Srotas* can be loosely compared with various systems of the body, such as the circulatory, respiratory, digestive, lymphatic, and reproductive systems. For instance, *Pranavaha Srotas*, responsible for the flow of *Prana* or vital breath, aligns with the respiratory and circulatory systems. *Raktavaha Srotas*, which circulates *Rakta* (blood), corresponds to the cardiovascular system, while *Annavaha Srotas*, which deals with the transport of nutrients, can be compared to the digestive system.

However, the Ayurvedic perspective adds a layer of functional understanding that extends beyond the physical, emphasizing the energetic and subtle aspects of these pathways. This holistic view underscores the importance of maintaining the integrity of *Srotas* to ensure the smooth functioning of both gross and subtle bodily processes, a concept not directly addressed in modern medicine.

Clinical implications

Understanding the Ayurvedic concept of *Srotas* offers valuable insights for both preventive and therapeutic approaches in healthcare. The maintenance of healthy *Srotas* is crucial in preventing *Sammurchana* (pathological conditions) caused by the imbalance of *Doshas* and *Dhatus*. For example, blockages in *Srotas* can lead to conditions such as *Sanga* (obstruction) and *Atipravritti* (excessive flow), which may manifest as diseases in their respective systems, such as atherosclerosis or hypertension in the circulatory system.

Ayurvedic therapies like *Panchakarma* (detoxification procedures) and *Rasayana* (rejuvenation therapies) are designed to cleanse and rejuvenate the *Srotas*, ensuring their optimal function. This perspective also supports the

use of specific herbs and dietary practices to maintain the health of these channels, thereby preventing disease and promoting longevity.

Relevance of srotas in modern context

Incorporating the Ayurvedic understanding of *Srotas* into modern clinical practice could enhance the holistic management of chronic diseases, where the emphasis on detoxification and rejuvenation could complement conventional treatments. Moreover, the focus on subtle energy channels might offer new perspectives in managing psychosomatic disorders, where the balance of mind and body is crucial.

Our study highlights the need for further interdisciplinary research to explore the physiological and therapeutic parallels between the Ayurvedic concept of *Srotas* and modern biomedical sciences. This could lead to an integrated approach that harnesses the strengths of both traditional and modern medicine.

CONCLUSION

The Ayurvedic concept of *Srotas* provides a unique and holistic framework for understanding the body's physiological processes. By recognizing the interconnectedness of these channels with both gross and subtle aspects of the body, Ayurveda offers profound insights into maintaining health and preventing disease. Our study underscores the potential benefits of integrating these ancient concepts into modern healthcare practices, particularly in the realms of preventive medicine and chronic disease management. Future research should focus on further validating these concepts and exploring their applications in contemporary clinical settings.

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