



# “Tridosha and Homeostasis: An Integrative Review of Ayurvedic and Modern Concepts”

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## Abstract

### Introduction

The concept of Tridosha forms the basis of Ayurvedic physiology and explains the functional organization of the human body through the three Doshas—Vata, Pitta, and Kapha.<sup>1-3</sup> These Doshas regulate various physiological activities, and their balanced state is considered essential for maintaining health. In modern physiology, the concept of homeostasis refers to the ability of the body to maintain a stable internal environment through coordinated regulatory mechanisms.<sup>4-6</sup> The present review attempts to examine the relationship between Tridosha and homeostasis from an integrative perspective. The analysis indicates that the Tridosha framework may be interpreted as a traditional model of physiological regulation comparable to modern homeostatic mechanisms. Understanding this association may help establish a meaningful bridge between classical Ayurvedic concepts and contemporary biomedical science.

### Materials & Methods:

An integrative review of classical Ayurvedic literature and contemporary scientific studies related to physiology, homeostasis, and systems biology was conducted. Relevant articles from databases such as PubMed and Google Scholar were analyzed to compare Ayurvedic and biomedical perspectives.

### Results:

The review revealed notable similarities between Tridosha and homeostatic regulation. Vata corresponds to movement and neural control, Pitta to metabolism and thermoregulation, and Kapha to structural integrity and immune support. Both systems emphasize balance as essential for health and imbalance as a cause of disease. However, Ayurveda adopts an individualized constitutional approach, whereas modern medicine focuses on measurable physiological parameters.

### Conclusion:

Tridosha and homeostasis represent complementary models of body regulation. Integrating Ayurvedic principles with modern biomedical concepts may enhance preventive, personalized, and holistic healthcare. Further interdisciplinary research is needed to validate and apply these integrative perspectives in clinical practice.

**Keywords:** Tridosha, Vata, Pitta, Kapha, Homeostasis, Ayurveda, Transformation, Nervous system, Immune system, Structural Integrity, Endocrine system, Metabolism

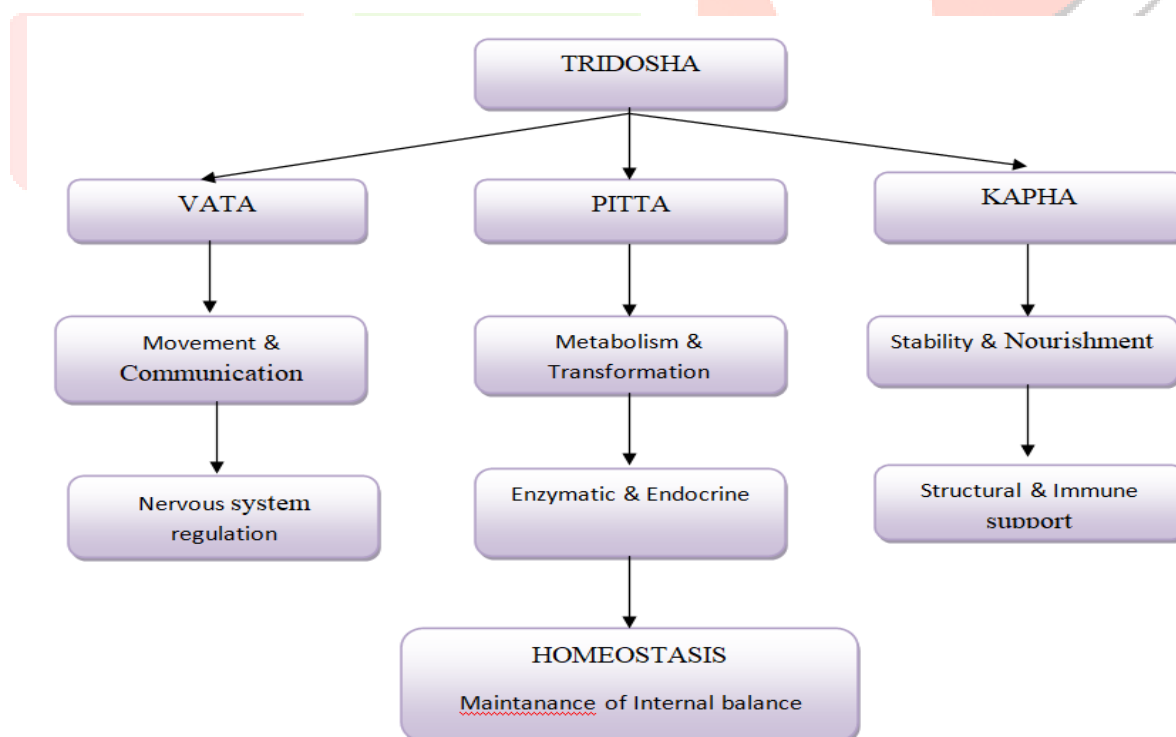
## Introduction

The human body functions as a highly organized and dynamic system that constantly adapts to internal and external changes. For survival and normal physiological functioning, the body must preserve stability within its internal environment despite varying conditions. Modern physiology explains this adaptive balance through the principle of homeostasis, which involves the coordinated action of nervous, endocrine, metabolic, and other regulatory systems. Homeostatic mechanisms maintain important physiological parameters such as body temperature, pH, fluid balance, blood glucose level, and energy metabolism within an optimal range.<sup>4-6</sup>

Ayurveda describes a comparable concept of physiological regulation through the theory of Tridosha, consisting of Vata, Pitta, and Kapha. These three Doshas are regarded as the principal functional entities responsible for controlling all biological activities in the body. Classical Ayurvedic texts explain that equilibrium among the Doshas is essential for health, whereas disturbance in their balance leads to disease<sup>1-3</sup>. Each Dosha performs specific physiological roles: Vata governs movement and communication, Pitta regulates transformation and metabolism, and Kapha provides structural stability and nourishment.

Although Ayurveda and modern biomedical science differ in their theoretical frameworks, both systems emphasize the importance of maintaining internal balance for sustaining health. From a functional perspective, Vata may be associated with neural regulation and signaling activities, Pitta with metabolic and enzymatic processes, and Kapha with anabolic functions and structural maintenance.

In recent years, increasing attention has been given to integrating traditional medical knowledge with modern scientific understanding. Exploring the relationship between Tridosha and homeostasis may contribute to a broader interpretation of health and disease while improving the scientific relevance and clinical applicability of Ayurvedic principles. Such an integrative approach may also support the development of preventive, holistic, and personalized healthcare strategies.



Flow chart 1.0

## Materials and Methods

A narrative review was conducted using classical Ayurvedic texts, including the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya, along with contemporary literature from physiology, systems biology, and integrative medicine. Relevant articles were identified through electronic databases such as PubMed, Scopus, and Google Scholar using keywords including “Tridosha,” “homeostasis,” “Ayurveda,” “physiology,” and “integrative medicine.” The collected literature was analyzed to identify conceptual correlations between Doshik functions and modern physiological regulatory mechanisms.

## Concept of Tridosha

The theory of Tridosha constitutes the foundation of Ayurvedic physiology and serves as the basis for understanding both normal bodily functions and pathological conditions. According to classical Ayurvedic literature, especially Charaka Samhita, the human body is governed by three primary functional principles known as Vata, Pitta, and Kapha.<sup>1</sup> These Doshas are dynamic regulatory factors rather than structural entities and are responsible for coordinating all physiological and biochemical activities in the body.

The state of equilibrium (Samya) among the Doshas is considered necessary for maintaining health, whereas imbalance (Vaishamyā) results in disease manifestation.<sup>1-3</sup> The term “Dosha” is derived from the Sanskrit root “दूष,” meaning “to vitiate or disturb,” indicating that these functional principles can contribute to pathology when disturbed. However, in their balanced state, they maintain physiological harmony and support normal body functions.

Each Dosha possesses characteristic qualities, specific sites of predominance, and distinct physiological functions. Together, they regulate the proper functioning of the body and help maintain internal balance.

### Vata Dosha

Functionally, Vata governs respiration, circulation, movement, sensory and motor activities, transmission of nerve impulses, and elimination of waste products. It also coordinates communication between different body systems and regulates various dynamic physiological activities. Vata is further classified into five subdivisions—Prana, Udana, Samana, Vyana, and Apana—each responsible for specific bodily functions.

From the perspective of modern physiology, Vata may be correlated with the nervous system and regulatory mechanisms involved in movement, communication, and coordination.<sup>4-6</sup>

### Pitta Dosha

Pitta regulates digestion, absorption, assimilation, enzymatic activity, and various biochemical reactions occurring in the body. It also contributes to hormonal regulation, maintenance of body temperature, vision, intellect, and pigmentation. Similar to Vata, Pitta is divided into five subtypes—Pachaka, Ranjaka, Sadhaka, Alochaka, and Bhrajaka—each performing specialized physiological roles.

In modern scientific terms, Pitta can be functionally associated with metabolic pathways, enzymatic reactions, endocrine regulation, and biochemical transformations essential for maintaining physiological balance.<sup>4-6</sup>

### Kapha Dosha

Kapha is responsible for tissue formation, growth, lubrication of joints, maintenance of body fluids, strength, endurance, and immunity. It supports structural cohesion and contributes to anabolic activities within the body. Kapha is further classified into five types—Kledaka, Avalambaka, Bodhaka, Tarpaka, and Shleshaka—each contributing to physiological stability.

In relation to modern physiology, Kapha may be associated with structural components of the body, anabolic processes, extracellular fluids, and aspects of immune function.<sup>4-6</sup>

## Equilibrium of Tridosha

The balanced state of Vata, Pitta, and Kapha is essential for maintaining normal physiological activities and overall health. Proper equilibrium among the Doshas supports digestion, metabolism, tissue nourishment, waste elimination, and coordinated body functions. Disturbance in the balance of the Doshas leads to functional abnormalities and eventually results in disease.

Ayurveda explains that the Doshas are influenced by several factors including diet (Ahara), lifestyle (Vihara), seasonal variation (Rutu), and psychological condition. Therefore, maintenance of Dosha equilibrium requires a holistic approach involving proper food habits, daily routine, seasonal adaptation, and healthy lifestyle practices.

## Tridosha as Functional Regulators

Tridosha represents functional and regulatory principles rather than structural components of the body. Together, Vata, Pitta, and Kapha coordinate multiple physiological activities and maintain internal balance. This functional interpretation closely resembles the modern concept of systemic regulation and homeostasis, where various organ systems act in coordination to sustain life and preserve physiological stability.<sup>4-6</sup>

## Correlation between Tridosha and Homeostasis

Homeostasis in modern physiology is explained through measurable biochemical and physiological mechanisms that maintain internal stability. In Ayurveda, Tridosha represents a qualitative and functional framework describing the dynamic balance of biological processes. Despite differences in conceptual language, both systems emphasize regulation, adaptation, and maintenance of equilibrium.

Vata, characterized by qualities such as mobility, subtlety, and lightness, governs movement and communication within the body. It may therefore be correlated with neural regulation and neurophysiological mechanisms responsible for sensory and motor functions, signal transmission, and coordination of body activities. Similar to the nervous system, Vata controls rapid responses and dynamic physiological processes necessary for maintaining balance.

Pitta is associated with heat, transformation, and metabolism. It regulates digestion, enzymatic activity, hormonal function, and energy production. In modern physiology, these activities are mediated through metabolic pathways, enzymes, and endocrine systems. Thus, Pitta reflects the transformative and metabolic dimension of homeostasis.

Kapha is characterized by stability, heaviness, and cohesion and provides structural support and nourishment. It can be correlated with anabolic activities, tissue maintenance, fluid balance, and immune support. Kapha represents the stabilizing and protective mechanisms that preserve structural integrity and physiological resilience.

Together, the coordinated activities of Vata, Pitta, and Kapha maintain functional balance within the body, comparable to the integrated regulatory mechanisms involved in homeostasis.

Tridosha	Major Ayurvedic Functions	Possible Correlation in Modern Physiology	Role in Homeostasis
Vata	Governs movement, communication, respiration, circulation, and sensory-motor activities	Nervous system, neural signaling pathways, neuro-regulatory mechanisms	Maintains coordination, rapid adaptation, and physiological communication
Pitta	Controls digestion, metabolism, transformation, enzymatic activity, and heat production	Metabolic pathways, enzymes, endocrine regulation, biochemical reactions	Maintains metabolic balance, energy production, and biochemical equilibrium
Kapha	Provides stability, nourishment, lubrication, tissue growth, and immunity	Structural components, immune function	Maintains structural integrity, fluid balance, and physiological stability

Table 1.0

## Additional Comparative Insights

Aspect	Ayurveda (Tridosha Concept)	Modern Physiology (Homeostasis)
Basic Principle	Maintenance of <u>Dosha</u> equilibrium	Maintenance of internal stability
Functional Units	Vata, Pitta, Kapha	Nervous, endocrine, immune, and metabolic systems
Cause of Disease	Imbalance of <u>Doshas</u>	Disturbance in physiological regulation
Regulatory Nature	Qualitative and functional	Quantitative and biochemical
Adaptation Mechanism	Response to <u>Ahara</u> , <u>Vihara</u> , <u>Ritu</u> , and <u>Manasika</u> factors	Response to environmental and internal stimuli
Therapeutic Aim	Restoration of <u>Dosha</u> balance	Restoration of physiological equilibrium
Preventive Approach	<u>Dinacharya</u> , <u>Ritucharya</u> , <u>Pathya Ahara</u>	Lifestyle modification and preventive medicine

Table 2.0

Dosha	Predominant Mahabhutas	Main Qualities (Guna)	Primary Physiological Role
Vata	<u>Akasha</u> + <u>Vayu</u>	<u>Ruksha</u> , <u>Laghu</u> , <u>Sheeta</u> , <u>Chala</u>	Movement and communication
Pitta	<u>Agni</u> + <u>Jala</u>	<u>Ushna</u> , <u>Tikshna</u> , <u>Drava</u>	Metabolism and transformation
Kapha	<u>Prithvi</u> + <u>Jala</u>	<u>Guru</u> , <u>Sthira</u> , <u>Snigdha</u>	Stability and nourishment

Table 3.0

## Discussion

In Ayurveda, Tridosha serves as a functional model governing both physiological and pathological processes. Vata, Pitta, and Kapha work together to regulate movement, metabolism, and structural stability respectively. Likewise, modern physiology explains homeostasis through the integrated functioning of multiple regulatory systems including the nervous, endocrine, immune, and metabolic systems. This conceptual similarity suggests that Tridosha may be interpreted as a holistic representation of homeostatic regulation.

Vata Dosha demonstrates a strong resemblance to neural and neuro-regulatory mechanisms because of its role in communication and movement. Functions such as transmission of nerve impulses, reflex coordination, and regulation of body responses parallel the activities attributed to Vata. Disturbances in Vata may therefore be compared with dysfunctions involving neural regulation.

Pitta Dosha shows similarity with metabolic and biochemical processes described in modern science. Digestive activity, enzymatic reactions, hormonal regulation, and energy metabolism are important for maintaining metabolic balance and closely correspond to the functions of Pitta. Conditions involving Pitta imbalance may thus be interpreted in terms of altered metabolic or biochemical activity.

Kapha Dosha is related to structural stability, growth, tissue nourishment, lubrication, and immune support. These functions resemble anabolic processes, maintenance of extracellular matrix, fluid balance, and protective physiological mechanisms described in modern physiology. Kapha therefore contributes to preservation of structural and functional integrity.

Although Ayurveda and modern physiology use different terminologies and conceptual frameworks, both systems recognize the importance of maintaining internal balance for sustaining health and preventing disease.<sup>1-6</sup> Understanding these similarities may help promote integrative approaches in healthcare and broaden scientific understanding of Ayurvedic physiology.

## Conclusion

The concept of Tridosha represents one of the central principles of Ayurvedic physiology and describes the functional regulation of the body through Vata, Pitta, and Kapha. Proper balance among these Doshas is considered essential for maintaining health and normal physiological functioning. In modern physiology, homeostasis refers to the coordinated mechanisms responsible for preserving internal stability and supporting adaptation to changing conditions.

The present review suggests that the Tridosha framework can be functionally correlated with homeostatic regulation.<sup>4-8</sup> Vata may be associated with neural and regulatory activities, Pitta with metabolic and biochemical processes, and Kapha with structural stability and anabolic functions. Although the conceptual approaches differ, both systems emphasize the importance of internal equilibrium in preserving health.

Understanding the relationship between Tridosha and homeostasis may help bridge traditional Ayurvedic principles with contemporary biomedical science. Such an integrative perspective could enhance the scientific interpretation of Ayurveda and contribute to the development of preventive, holistic, and personalized healthcare approaches.

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