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Review Article

Critical Analysis of *Tridosha Siddhanta* in Light of Modern Physiology: An Integrative Review

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ABSTRACT

The *Tridosha Siddhanta* constitutes the foundational theoretical framework of Ayurveda, describing physiological and pathological processes through the dynamic interplay of *Vata*, *Pitta*, and *Kapha*. Despite its central role in clinical practice, its correlation with modern physiological principles remains a subject of ongoing debate. This review aims to critically analyze the *Tridosha Siddhanta* in the context of contemporary biomedical understanding, exploring its conceptual parallels, limitations, and translational relevance. A structured literature review was conducted using PubMed, Scopus, Web of Science, and classical Ayurvedic texts including *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. The findings suggest that *Vata* may be functionally correlated with neurophysiological processes and movement regulation, *Pitta* with metabolic and enzymatic activities, and *Kapha* with structural integrity and anabolic processes. However, these correlations remain largely interpretative and lack direct empirical validation. Modern physiology, grounded in molecular and cellular mechanisms, provides precise quantification and experimental

reproducibility, whereas the *Tridosha* framework offers a systemic, qualitative, and individualized approach. The review highlights both conceptual overlaps and epistemological differences, emphasizing the need for integrative research methodologies. Bridging traditional Ayurvedic principles with modern biomedical science could facilitate the development of personalized and holistic healthcare models. Further interdisciplinary studies employing systems biology and computational modelling are required to substantiate these correlations and enhance their clinical applicability.

Keywords: *Tridosha Siddhanta, Ayurveda, Vata, Pitta, Kapha,* modern physiology, integrative medicine

1. Introduction

The *Tridosha Siddhanta* represents the cornerstone of Ayurvedic physiology, proposing that the human body is governed by three fundamental regulatory principles: *Vata*, *Pitta*, and *Kapha* [1]. These entities are not merely structural components but dynamic functional principles responsible for maintaining homeostasis.

In contrast, modern physiology explains bodily functions through cellular, molecular, and biochemical mechanisms. While Ayurveda adopts a qualitative and systemic perspective, modern science emphasizes quantitative and reductionist approaches [2].

The increasing interest in integrative medicine has prompted attempts to correlate *Tridosha* with modern physiological systems. However, these correlations often lack rigorous scientific validation and may oversimplify complex traditional concepts.

Aim and Objectives:

- To critically analyze the concept of *Tridosha Siddhanta*
- To explore correlations with modern physiological systems
- To identify conceptual similarities and differences
- To evaluate the scientific validity and limitations of such correlations

2. Methodology of Literature Review

Databases searched: PubMed, Scopus, Web of Science, Google Scholar
Keywords used: “Tridosha”, “Vata Pitta Kapha physiology”, “Ayurveda and modern physiology”, “systems biology Ayurveda”

3. Historical Perspective

The concept of *Tridosha* is elaborately described in classical Ayurvedic texts such as *Charaka Samhita* and *Sushruta Samhita*. These texts define *Doshas* as functional entities derived from the *Panchamahabhuta* (five elements) and responsible for physiological equilibrium [3].

- *Vata* – derived from air and ether
- *Pitta* – derived from fire and water
- *Kapha* – derived from earth and water

Historically, these principles were used to explain both normal physiology and disease pathogenesis long before the advent of modern biomedical science.

4. Review of Literature

4.1 Conceptual Framework of Tridosha

- Vata: Governs movement, communication, and neural control
- Pitta: Governs metabolism, digestion, and transformation
- Kapha: Governs structure, lubrication, and stability

These functions collectively maintain homeostasis (*Swasthya*) [4].

4.2 Correlation with Modern Physiology

Vata and Neurophysiology

Vata is often correlated with:

- Nervous system functions
- Neurotransmission
- Motor and sensory activities

Modern parallels include:

- Central and peripheral nervous systems
- Synaptic transmission
- Autonomic regulation

However, *Vata* also includes functions beyond neural activity, such as respiration and circulation, making it broader than any single system [5].

Pitta and Metabolic Processes

Pitta is associated with:

- Digestion (*Agni*)
- Enzymatic activity
- Thermoregulation

Modern equivalents:

- Enzyme systems
- Hormonal regulation
- Cellular metabolism

Despite similarities, *Pitta* encompasses both biochemical and psychological aspects, which are not directly measurable in modern physiology [6].

***Kapha* and Structural Physiology**

Kapha corresponds to:

- Structural integrity
- Fluid balance
- Immunological stability

Modern correlations include:

- Connective tissue
- Extracellular matrix
- Immune system

Yet *Kapha* integrates structural and functional stability in a way that transcends discrete anatomical systems [7].

4.3 Pathophysiology: *Dosha* Imbalance vs Disease Mechanisms

In Ayurveda:

- Disease arises from *Dosha imbalance*

In modern medicine:

- Disease is explained through:
    - Cellular dysfunction

- Genetic mutations
- Pathogen invasion

While both systems recognize homeostasis disruption, their explanatory models differ fundamentally [8].

4.4 Diagnostic Approaches

Ayurveda:

- Pulse examination (*Nadi Pariksha*)
- Observation and clinical judgment

Modern Medicine:

- Laboratory investigations
- Imaging techniques
- Biomarkers

Ayurvedic diagnosis is qualitative and individualized, whereas modern diagnosis is objective and standardized [9].

4.5 Therapeutic Implications

Ayurveda:

- Balancing *Doshas* through diet, drugs, and lifestyle
- Personalized medicine approach

Modern Medicine:

- Targeted pharmacotherapy
- Evidence-based protocols

The personalized nature of Ayurveda aligns with emerging concepts in precision medicine [10].

4.6 Systems Biology Perspective

Recent research attempts to interpret *Tridosha* through:

- Systems biology
- Network physiology

- Computational modeling

These approaches suggest that *Doshas* may represent emergent properties of complex biological systems rather than discrete entities [11].

5. Critical Analysis

Strengths of *Tridosha Siddhanta*

- Holistic and integrative framework
- Emphasis on individual variability (*Prakriti*)
- Preventive and lifestyle-oriented approach

Limitations

- Lack of measurable parameters
- Difficulty in experimental validation
- Variability in interpretation

Limitations of Modern Physiology

- Reductionist approach
- Limited integration of mind-body interactions
- Focus on disease rather than health

Synthesis

Rather than direct equivalence, *Tridosha* and modern physiology represent complementary paradigms:

- Ayurveda → qualitative, systemic
- Modern science → quantitative, analytical

6. Research Gaps and Limitations

- Absence of standardized tools to measure *Doshas*
- Limited interdisciplinary research
- Lack of large-scale clinical validation studies
- Over-simplistic correlations in existing literature

7. Future Perspectives

- Development of biomarkers for *Dosha* assessment
- Integration with genomics and metabolomics
- AI-based modeling of Ayurvedic principles
- Cross-disciplinary clinical trials
- Validation through systems biology frameworks

8. Conclusion

The *Tridosha Siddhanta* remains a sophisticated theoretical construct that offers a holistic understanding of human physiology. While attempts to correlate it with modern physiological systems reveal conceptual overlaps, direct equivalence is neither feasible nor scientifically justified at present. Instead, both systems should be viewed as complementary frameworks, each contributing unique insights into health and disease. Future integrative research grounded in systems biology and empirical validation may bridge the gap, enabling a more comprehensive and personalized approach to healthcare.

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