

Bridging Ayurveda and modern neurology: A Co.M.S. (collaborative medicine and science) approach to Alzheimer's disease

The integration of traditional medical systems with modern medicine has garnered significant attention in recent years.^[1] Traditional systems like Ayurveda have developed sophisticated frameworks for understanding health and disease, yet integrating these with modern medicine presents significant challenges. These include differences in terminology, concepts, diagnostic approaches, and therapeutic strategies.^[2,3] Integration efforts often fail by attempting to explain traditional concepts through modern scientific frameworks, potentially losing the holistic perspective that makes traditional systems valuable.^[4]

To address these challenges, we propose the Collaborative Medicine and Science (Co.M.S.) framework, which aims to create a synergistic interaction between traditional and modern medicine while maintaining the integrity of both systems.^[5,6]

The Collaborative Medicine and Science (Co.M.S.) framework consists of three key components:

1. Reformulation and Contextualization: This involves translating Ayurvedic concepts into language comprehensible to modern science. It requires a deep understanding of both systems to find common ground while preserving Ayurvedic principles.
2. Ayurveda Modeling: This focuses on creating scientific and conceptual models that bridge Ayurvedic and modern medical understanding, helping to visualise and explain Ayurvedic concepts in terms familiar to modern scientists and clinicians.
3. Ayurveda Localization: This recognises Ayurveda's universal applicability while adapting it to local conditions and cultural contexts. It involves applying core Ayurvedic principles in diverse geographical and cultural settings, such as adapting dietary recommendations to local food sources or modifying treatment protocols based on regional health priorities and available resources.

While the three components of CoMS can be described individually, they operate as an interconnected and dynamic system in practice. Reformulation drives the development of models, which in turn inform localization efforts. At the same time, challenges encountered during localization often prompt refinements in both modeling and reformulation.

The methodological premise of Co.M.S. is to elucidate modern medical concepts through Ayurvedic principles rather than viceversa. This approach leverages traditional medicine's comprehensive framework to encompass modern medicine's precise, targeted approach while adding layers of understanding. By interpreting scientific findings through Ayurvedic concepts, we can enhance our comprehension of complex disorders, adding nuance to current biomedical models. This method preserves Ayurveda's sophisticated framework while enriching modern medical perspectives, aiming not to supplant but to complement and expand modern understanding, fostering a more comprehensive and integrative approach to health and disease.

To demonstrate the potential of this methodological approach, we examine its application to a complex neurodegenerative condition where traditional insights could have accelerated modern discoveries. Alzheimer's disease (AD) is an excellent model to demonstrate the potential of the Co.M.S. approach, though Co.M.S. is designed for broader application across medical systems and conditions. By integrating Ayurvedic concepts with modern neuroscience, novel hypotheses and insights into the pathogenesis and progression of AD can be developed.

Ayurveda describes AD as a Vata-predominant disorder with secondary involvement of Pitta and Kapha dosha.^[7] This understanding aligns remarkably with modern observations: increased corresponds to cortical atrophy and ventricular enlargement,^[8] Pitta imbalance manifests as altered metabolism and neuroinflammation,^[9] while Kapha/Ama accumulation appears as amyloid plaques and neurofibrillary tangles.^[10] This correlation between traditional understanding and modern findings provides a foundation for deeper investigation.

The membrane theory of AD exemplifies Co.M.S.'s potential. This insight integrates Ayurvedic understanding of Vata imbalance with modern findings on amyloid precursor protein (APP) processing.^[11,12] The hypothesis posits that Vata imbalance leads to decreased Kapha qualities, affecting cellular membranes and exposing APP to increased β - and γ -secretase activity. Modern research has validated this concept through multiple lines of evidence: altered membrane lipid composition in AD brains,^[13] influence of membrane thickness on γ -secretase activity,^[14] and membrane alterations in various cell types including erythrocytes,^[15] platelets,^[16] fibroblasts,^[17] and lymphocytes.^[18]

These systemic membrane alterations strongly support the Ayurvedic view of AD as a systemic disorder rather than a purely localized brain condition. All additional evidence for AD's systemic nature reflects Vata disturbance manifestations that could have been predicted from the Ayurvedic classification of AD as a Vata disorder: metabolic dysfunction in brain and peripheral tissues^[19] reflects Vata's role in cellular nutrition, systemic inflammation preceding clinical symptoms^[20] shows Vata's function in immune response, gut microbiome involvement^[21] relates to Vata's primary seat in the colon, and circadian rhythm disruptions^[22] demonstrate Vata's governance of biological rhythms. This systemic perspective, inherent in the understanding of Vata pathology, helps explain why individuals with similar risk factors develop different disease trajectories based on their constitution (Prakriti).

Recent research has provided remarkable validation for Prakriti's relevance in disease susceptibility. Studies reveal significant correlations between Prakriti types and genomic variations,^[23] gene expression patterns,^[24] and gut microbial communities.^[25] These findings suggest that Prakriti assessment could enable early identification of individuals at higher risk for AD, particularly those with Vata predominance who might be more susceptible to membrane instability.^[26]

The membrane theory of AD exemplifies Co.M.S.'s potential and demonstrates how this approach could have led to earlier discoveries. Had we applied Ayurvedic understanding of Vata imbalance systematically through the Co.M.S. framework, we might have identified membrane alterations as a key factor in AD pathogenesis years before modern research eventually confirmed this finding. Similarly, the Ayurvedic view of AD as a systemic Vata disturbance predicted the now-emerging evidence of system-wide membrane alterations, metabolic dysfunction, and inflammatory processes.

This example powerfully illustrates how Co.M.S. could accelerate medical discoveries across all fields. By starting from traditional medical systems' sophisticated understanding of disease processes and systematically investigating their insights through modern scientific methods, we could identify promising research directions more efficiently. The systemic view of disease inherent in traditional medical systems, validated in AD, could guide our understanding of other conditions, potentially leading to earlier recognition of systemic involvement in seemingly localized diseases. This approach could significantly reduce the time and resources needed to uncover complex disease mechanisms while suggesting more effective therapeutic strategies.

The implications extend beyond AD. The Co.M.S. approach demonstrates how traditional medicine can guide modern research while modern findings can validate and refine traditional understanding. This bidirectional enrichment can lead to several advances: improved understanding of disease mechanisms, identification of new therapeutic targets, and development of personalized prevention strategies based on individual constitution.

By providing a structured way to leverage the strengths of both traditional and modern medicine while respecting their distinct epistemologies, Co.M.S. offers a path toward more effective, personalized healthcare solutions.

This collaborative model not only promises to enhance our understanding and treatment of complex disorders but also sets a new standard for integrative medicine in the 21st century.^[27,28]

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Conflicts of interest

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