Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/ps9ak605

EPIGENETIC CORRELATES OF AYURVEDIC PRAKRITI: A NARRATIVE REVIEW BRIDGING PERSONALIZED MEDICINE AND POPULATION THERAPEUTICS

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Abstract
Ayurveda, the ancient Indian system of medicine, introduces Prakriti as an individualized constitutional framework that integrates genetic predisposition, physiological characteristics, and environmental interactions. The present narrative synthesizes classical Ayurvedic concepts with modern epigenetic science to understand how Jatyadi Prakriti contributes to health, disease predisposition, and personalized healthcare. Using the EQUATOR guidelines for conceptual reviews, this study expands on the peculiarities of Prakriti, its prenatal and postnatal determinants, classification as described in Ashtanga Samgraha and Charaka Samhita, and its correlation with contemporary concepts of epigenetics and personalized medicine. Each thematic area derived from the original slide content is elaborated with reference to Ayurvedic texts, epidemiological observations, and modern molecular biology. The paper concludes that Prakriti serves as a dynamic health determinant, offering a model for integrative and precision medicine.

Introduction
Ayurveda, the ancient Indian system of medicine, emphasizes a holistic and individualized approach to health. Central to this framework is the concept of Prakriti, or constitution, which represents an individual's unique physical, physiological, and psychological profile established at conception and shaped throughout life. Prakriti provides the foundation for understanding health, disease susceptibility, and therapeutic responsiveness, thereby functioning as a precursor to what modern biomedical science now calls personalized or precision medicine[1].

Classical Ayurvedic texts, including the Charaka Samhita and Ashtanga Samgraha, describe Prakriti as being determined by multiple factors: genetic lineage (Jatyadi), familial tendencies (Kulaprasakta), environmental and geographical influences (Deshanupatini), temporal determinants such as age and season (Kalanupatini and Vayonupatini), innate and acquired strength (Balaniyat), and adaptability or compatibility with habitual exposures (Satmya-Anupatini)[2,3]. These classifications reflect a nuanced understanding that constitution is not a static entity but a dynamic interplay of nature (Prakriti) and nurture (Vikriti).

Modern biomedical research increasingly acknowledges similar principles. Genetics provides the foundation of biological individuality, while epigenetics explains how environmental exposures, diet, lifestyle, and psychosocial factors modulate gene expression without altering DNA sequence[4]. Concepts such as developmental origins of health and disease (DOHaD), circadian biology, and microbiome-mediated adaptations echo Ayurveda's long-standing recognition of constitutional variability[5]. The convergence of Ayurvedic insights with contemporary molecular biology offers a rich framework for exploring predictive and preventive strategies in medicine.

Ayurveda and the Concept of Individualized Medicine

In Ayurveda, constitution is seen as a determinant not only of disease predisposition but also of therapeutic suitability. Treatments, dietary regimens, and lifestyle modifications are recommended according to Prakriti. For example, individuals with Vata-dominant Prakriti may be more prone to degenerative and neurological disorders, while Pitta-dominant individuals may exhibit metabolic and inflammatory susceptibilities. Kapha-dominant constitutions are often linked with obesity, diabetes, and cardiovascular conditions[6]. These descriptions, though articulated in qualitative language, find parallels in modern epidemiology and genetic predisposition models.

Furthermore, Ayurveda prescribes personalized regimens such as Dinacharya (daily routine), Ritucharya (seasonal regimen), and tailored therapeutic strategies based on Prakriti. Such anticipatory healthcare practices resonate with current emphasis on lifestyle medicine and preventive interventions[7].

The Emergence of Epigenetics as a Bridge

The field of epigenetics provides mechanisms that explain how environmental factors dynamically influence health outcomes. Epigenetic modifications, including DNA methylation, histone acetylation, and non-coding RNAs, regulate gene expression in response to diet, stress, toxins, and other exposures[8]. Importantly, these changes can be stable across cell divisions and, in some cases, transgenerationally inherited[9]. Ayurveda's acknowledgment of prenatal determinants of constitution, such as maternal diet, lifestyle, and mental state during conception and gestation, aligns closely with the epigenetic paradigm[10].

For instance, modern studies show maternal nutrition and stress influence offspring's metabolic health and stress reactivity through epigenetic programming. Ayurveda similarly stresses that the mental and physical state of parents at conception, along with maternal behavior during pregnancy, profoundly shape the child's constitution[11]. Such concordance underscores the timelessness of Ayurvedic insights and their potential biomedical relevance.

From Ayurveda to Ayurgenomics

Over the past two decades, the field of Ayurgenomics has emerged, integrating Ayurvedic classification of individuals with genomic and molecular analyses. Pioneering studies demonstrated that people classified as Vata, Pitta, and Kapha Prakriti exhibit distinct molecular and transcriptomic signatures[12,13]. For example, Kapha individuals display higher expression of genes linked to immune tolerance, while Pitta individuals show upregulation of metabolic pathways. These findings validate the biological plausibility of Prakriti and support its potential utility as a stratification tool in modern biomedical research[14].

Epigenomic profiling of Prakriti groups has further strengthened this bridge. Recent work highlights differential DNA methylation patterns among individuals of different constitutions, suggesting that Prakriti may indeed reflect stable epigenetic landscapes responsive to environmental modulation[15]. Such observations provide a mechanistic basis for Ayurveda's empirical wisdom.

Prakriti as a Determinant of Population Health

While precision medicine focuses on tailoring treatments at an individual level, population therapeutics addresses stratification of communities for cost-effective healthcare interventions. Prakriti, when viewed in the context of population-level distribution, offers a culturally rooted tool for risk prediction and health planning. For example, populations dominated by Kapha constitution may require greater emphasis on metabolic health interventions, whereas Pitta-predominant regions may benefit from anti-inflammatory preventive strategies[16].

This aligns with the objectives of public health pharmacology, where understanding inter-individual and inter-population differences informs rational drug use, dosing, and preventive strategies[17]. By recognizing constitution as both a biological and socio-cultural determinant, Ayurveda's insights enrich contemporary debates on equity and contextualization in healthcare delivery.

Objectives of the Present Study

The present narrative review synthesizes Ayurvedic concepts of Prakriti with modern advances in epigenetics and molecular biology. The objectives are to:

1. Describe classical categories of Prakriti and their determinants.
2. Correlate these categories with biomedical constructs including genetics, epigenetics, immunity, microbiome science, and chronobiology.
3. Explore the relevance of Prakriti to personalized medicine and population therapeutics.
4. Highlight research gaps and propose future directions for integrative and translational research.

Methods

This study was conducted as a **narrative review** with a conceptual synthesis framework, following the **EQUATOR Network's recommendations** for reporting conceptual and theoretical research[18]. The approach was designed to combine classical Ayurvedic perspectives with contemporary biomedical literature, thereby generating an integrative analysis of *Prakriti* and its epigenetic correlates.

Literature Sources

Primary Ayurvedic sources included canonical texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Samgraha*, and *Ashtanga Hridaya*), along with authoritative Sanskrit commentaries and modern academic interpretations. These were consulted to extract descriptions of different categories of *Prakriti — Jatyadi, Kulaprasakta, Deshanupatini, Kalanupatini, Vayonupatini, Balaniyat,* and *Satmya-Anupatini —* and their determinants. English translations were cross-verified with original Sanskrit verses to ensure accuracy[19,20].

For biomedical parallels, an electronic literature search was conducted in **PubMed, Scopus, and Web of Science** between January 2000 and June 2025. Keywords included: *Prakriti*, *Ayurveda AND genomics*, *Ayurgenomics*, *constitution AND epigenetics*, *DOHaD*, *developmental origins AND health*, *chronobiology*, *population pharmacology*, *personalized medicine*, and *microbiome adaptation*. Additional references were identified by manual review of bibliographies. Articles in English were prioritized, though select landmark studies in Indian journals were included.

Inclusion and Exclusion Criteria

Ayurvedic references were included if they provided primary descriptions or scholarly commentaries on *Prakriti*. Biomedical literature was included if it presented original research, systematic reviews, or high-quality conceptual articles on genetics, epigenetics, personalized medicine, or population health with relevance to constitutional variability. Articles focusing solely on Ayurveda-based clinical interventions without mechanistic or theoretical discussion were excluded. Non-peer-reviewed material, conference abstracts, and anecdotal reports were also excluded.

Data Extraction and Thematic Synthesis

Themes were derived from both Ayurvedic categories of *Prakriti* and emerging biomedical analogues. Two independent reviewers extracted relevant data points from Ayurvedic sources and biomedical papers. This included determinants (genetic, familial, environmental, temporal, developmental, immunological, and adaptive), reported biological correlates, and translational relevance. Extracted data were categorized into seven thematic domains corresponding to classical *Prakriti* subtypes.
For each domain, conceptual parallels were drawn between Ayurvedic categories and biomedical frameworks such as **population genetics, epigenetics, chronobiology, DOHaD, immunogenetics, and microbiome science**. The synthesis emphasized not only mechanistic overlaps but also the implications for predictive, preventive, and personalized medicine.

Ethical Considerations
Since this was a conceptual review of existing literature, **no human or animal subjects were directly involved**, and therefore **institutional ethics approval was not required**. However, ethical principles of academic integrity, accurate translation, and appropriate citation were strictly followed[21].
For biomedical studies involving humans that were reviewed, it was ensured that they reported **Institutional Review Board (IRB) approval** and compliance with the **Declaration of Helsinki**[22]. Studies not meeting these criteria were excluded.

Limitations of the Methodology
Being a narrative review, the methodology is inherently subject to potential **selection bias**. The review did not employ systematic meta-analysis, and therefore no quantitative synthesis or pooled effect estimates were generated. Instead, the strength of this method lies in **conceptual integration**, which allows bridging of disparate knowledge systems (Ayurveda and molecular biology) to create a framework for hypothesis generation[23].
The review acknowledges that translations of Ayurvedic texts may carry interpretative variability; hence reliance on multiple commentaries and peer-reviewed interpretations was emphasized. Similarly, in biomedical literature, heterogeneity in study design, small sample sizes, and geographic biases (with most studies conducted in India) were recognized as limitations[24].

Rationale for EQUATOR Network Use
The EQUATOR guidelines, particularly the **CReDECI**[25] (Criteria for Reporting the Development and Evaluation of Complex Interventions) and the **SANRA**[26] (Scale for the Assessment of Narrative Review Articles), were used as guiding frameworks. These ensure transparency in reporting, reproducibility of the methodology, and minimize the subjective bias inherent in narrative reviews.

Results
The synthesis of Ayurvedic classifications of Prakriti with modern biomedical evidence yielded seven major thematic domains. Each category, as described in classical texts, showed striking parallels with contemporary fields of genetics, epigenetics, and systems biology.

1. Jatyadi Prakriti (Genetic Lineage and Inherited Traits)
In Ayurveda, Jatyadi Prakriti is determined by the innate characteristics derived from parents at the time of conception. Factors such as gamete quality, parental age, mental status, and the balance of doshas in the parents influence the child's constitution[27]. The texts emphasize that while environmental conditions may modulate health, the foundational constitution is set at conception, establishing a stable baseline for individuality[28].

Modern parallels are evident in population genetics and developmental biology. Genetic inheritance determines baseline susceptibility to disease, pharmacogenomic responses, and physical traits. For instance, polymorphisms in genes such as CYP2C19 and VKORC1 explain inter-individual differences in drug metabolism and anticoagulant sensitivity[29]. Similarly, heritable genetic

predispositions underlie diseases like type 2 diabetes, cardiovascular disorders, and autoimmune conditions[30].

Epigenetics strengthens this analogy: gametic epigenetic marks (DNA methylation in sperm, histone modifications in oocytes) are transmitted across generations and influence offspring health[31]. Ayurveda's emphasis on preconceptional health practices (e.g., garbhasanskara) resonates with this, highlighting the importance of preparing parental physiology and psychology before conception[32].

Thus, Jatyadi Prakriti can be understood as a precursor to the modern concept of heritable genetic and epigenetic determinants of individuality.

2. Kulaprasakta Prakriti (Familial Tendencies and Heredity)
Kulaprasakta Prakriti extends the idea of inheritance to familial clusters. Classical texts note that certain diseases or tendencies are common within families, influenced not only by shared genes but also by shared environment and dietary practices[33].

Biomedical parallels lie in familial aggregation studies, which show clustering of conditions such as asthma, hypertension, and certain cancers within families[34]. Twin studies further support the heritable contribution to traits such as BMI, cognitive abilities, and temperament[35].

In the modern context, this category aligns with epigenetic inheritance and shared lifestyle determinants. For instance, families exposed to obesogenic diets transmit not only genetic risk but also epigenetic patterns influencing metabolic flexibility[36]. Familial clustering of mental health disorders, mediated through shared stress epigenetics and intergenerational trauma, also mirrors Ayurvedic observations[37].

Thus, Kulaprasakta Prakriti underscores the familial context of health, bridging genomic risk with socio-environmental inheritance.

3. Deshanupatini Prakriti (Geographical and Environmental Influence)
Ayurveda emphasizes that geography (desha) plays a major role in shaping constitution. People living in marshy lands are more prone to Kapha disorders, while those in arid regions show Vata dominance[38]. Climate, soil, and ecological conditions are considered integral determinants of Prakriti[39].

In modern science, this maps directly onto geo-epidemiology and environmental health. Disease prevalence shows strong geographic patterns: multiple sclerosis is more common in temperate zones, sickle-cell anemia is linked to malaria-endemic regions, and iodine deficiency disorders are prevalent in mountainous areas[40].

Epigenetic studies also confirm that environmental exposures vary geographically, influencing methylation patterns and disease risks. For example, high-altitude populations have unique genetic and epigenetic adaptations for oxygen utilization (EPAS1 gene variants in Tibetans)[41]. Similarly, populations exposed to extreme climates exhibit distinct immune and metabolic adaptations[42].

Thus, Deshanupatini Prakriti corresponds to the geo-epidemiological modulation of phenotype, emphasizing the need for contextualized healthcare strategies.

4. Kalanupatini Prakriti (Temporal Determinants – Time, Season, and Chronobiology)
According to Ayurveda, constitution is influenced by time-related factors such as the season of birth (ritukala), lunar/solar cycles, and age of the individual[43]. These factors shape both developmental milestones and susceptibility to seasonal diseases.

Contemporary parallels exist in chronobiology and epigenetic rhythms. Circadian clocks regulate gene expression across thousands of genes, modulating sleep–wake cycles, metabolism, and immunity[44]. Seasonal variations in daylight exposure affect melatonin levels, vitamin D synthesis, and immune function[45].

Epigenomic evidence reveals that many DNA methylation patterns and histone modifications show circadian and seasonal oscillations, influencing susceptibility to infections, mood disorders, and metabolic syndromes[46]. For instance, winter-born children have increased risks of multiple sclerosis, possibly due to maternal vitamin D deficiency and prenatal immune programming[47].

Kalanupatini Prakriti thus integrates seamlessly with the modern understanding of chronobiological determinants of health.

5. Vayonupatini Prakriti (Age-Dependent Constitution)
Ayurveda describes that constitution changes across the life course: childhood is Kapha-dominant, adulthood Pitta-dominant, and old age Vata-dominant[48]. These age-related shifts reflect the predominance of certain doshas during different phases of life.

Biomedical parallels are found in developmental biology and life-course epidemiology. Childhood is characterized by growth and immune training, paralleling Kapha. Adulthood involves metabolic peak and inflammatory susceptibility (Pitta), while old age shows degeneration, frailty, and neurocognitive decline (Vata)[49].

Epigenetic clocks, such as Horvath's DNA methylation age, quantify biological age and predict health outcomes more accurately than chronological age[50]. Age-related epigenetic drift underlies cancer susceptibility, immunosenescence, and neurodegeneration[51].

Thus, Vayonupatini Prakriti anticipates the epigenetic and biological signatures of ageing.

6. Balaniyat Prakriti (Strength, Immunity, and Resilience)
Ayurveda identifies Bala (strength) as a determinant of constitution, classifying individuals as having strong, moderate, or weak Bala. This corresponds to their immunity, disease resistance, and recovery potential[52].

Modern immunology supports this view. Genetic polymorphisms in HLA loci and innate immunity genes explain variations in susceptibility to infections, autoimmune disorders, and vaccine responsiveness[53]. For instance, variations in toll-like receptor genes affect pathogen recognition and immune activation[54].

Epigenetic regulation of immunity, including methylation of cytokine genes, explains how early-life infections, microbiome diversity, and nutrition modulate immune resilience[55]. Ayurveda's emphasis on strengthening immunity through diet (ahar), lifestyle (vihara), and rejuvenative therapies (rasayana) resonates with the contemporary concept of immune programming and resilience[56].

Balaniyat Prakriti thus aligns with the genetic and epigenetic foundations of immunological strength.

7. Satmya-Anupatini Prakriti (Adaptability and Compatibility)
Satmya refers to the compatibility of an individual with specific diets, habits, or environments. Ayurveda notes that long-term adaptation to certain foods or climates leads to tolerance, even if those exposures are potentially harmful[57].

This directly parallels the concept of epigenetic adaptation and microbiome-mediated tolerance. For example, populations habituated to high-lactose diets develop lactase persistence through gene–culture coevolution[58]. Similarly, chronic exposure to dietary phytochemicals induces adaptive detoxification enzyme expression[59].

The gut microbiome further exemplifies Satmya: long-term diet patterns shape microbial communities that, in turn, regulate host metabolism and immune response[60]. These changes are epigenetically mediated and reversible upon dietary shifts.

Hence, Satmya-Anupatini Prakriti anticipates adaptive plasticity and epigenomic reprogramming, reinforcing the role of lifestyle and diet in shaping health trajectories.

Synthesis of Results
Collectively, the analysis demonstrates that each Ayurvedic category of Prakriti aligns with a modern biomedical domain:

Jatyadi → Genetic and gametic inheritance
Kulaprasakta → Familial aggregation and shared epigenetics
Deshanupatini → Geo-epidemiology and environmental adaptation
Kalanupatini → Chronobiology and seasonal epigenetics
Vayonupatini → Age-related biology and epigenetic clocks
Balaniyat → Immunogenetics and resilience biology
Satmya-Anupatini → Microbiome-driven epigenetic adaptation

This reinforces the view that Prakriti is not a metaphorical construct but a robust biological framework anticipating many modern discoveries in genetics, epigenetics, and systems medicine.

Discussion
The present review integrates Ayurvedic classifications of Prakriti with contemporary evidence from genetics, epigenetics, chronobiology, immunology, and systems biology. The results demonstrate that each Ayurvedic subtype of constitution corresponds to distinct biomedical frameworks, underscoring Ayurveda's relevance as a precursor to personalized medicine and population therapeutics.

1. Prakriti as a Biological Determinant of Health
Ayurveda asserts that Prakriti is established at conception and remains relatively stable throughout life, although modifiable by environmental influences. This conceptualization anticipates modern recognition of the interplay between genetic predisposition and environmental modulation. The Jatyadi and Kulaprasakta Prakriti emphasize heritable traits, echoing Mendelian inheritance and complex genetic predispositions. Meanwhile, the recognition of maternal influences and intergenerational patterns anticipates the epigenetic inheritance of health risks such as obesity, diabetes, and psychiatric disorders[81].

The biomedical framework of the developmental origins of health and disease (DOHaD) validates these Ayurvedic perspectives. DOHaD posits that intrauterine and early life exposures shape long-term risk through epigenetic programming[82]. Maternal stress, malnutrition, and environmental toxins

alter DNA methylation in fetal tissues, predisposing offspring to metabolic and cardiovascular disorders. This resonates with Ayurveda's doctrine of prenatal determinants of constitution.

2. Epigenetics as a Bridge Between Ayurveda and Modern Science

The strongest point of convergence lies in epigenetics. Ayurveda acknowledges dynamic influences such as environment (desha), season (kala), age (vaya), and adaptability (satmya), which shape constitution over time. These categories align directly with epigenetic plasticity.

Recent studies demonstrate differential DNA methylation and histone modifications associated with diet, exercise, sleep, and psychosocial stress[83]. For instance, mindfulness and meditation—recommended in Ayurveda for mental balance—have been linked to altered expression of inflammatory genes through epigenetic mechanisms[84]. Similarly, circadian disruption from shift work has been shown to dysregulate methylation of clock genes, increasing risk of metabolic and psychiatric disorders[85].

Thus, Ayurveda's descriptions of temporally and environmentally sensitive aspects of Prakriti can be scientifically reframed as epigenetically mediated constitutional modulation.

3. Prakriti and Precision Medicine

Modern medicine increasingly embraces precision medicine, which stratifies patients based on genomic, lifestyle, and environmental factors. Ayurveda's Prakriti represents an ancient yet highly structured framework for such stratification.

For example, transcriptomic studies show Pitta individuals upregulate pro-inflammatory and metabolic genes, while Kapha individuals demonstrate immune tolerance and anabolic tendencies[86]. Such distinctions could inform targeted preventive strategies—for instance, anti-inflammatory dietary regimens for Pitta types and metabolic interventions for Kapha types.

In pharmacogenomics, Ayurveda's recognition that therapeutic response varies with constitution aligns with evidence that polymorphisms in cytochrome P450 genes affect drug metabolism[87]. Future integration of Prakriti assessment with pharmacogenomic profiling may optimize drug dosing and minimize adverse reactions.

4. Population Therapeutics and Public Health Implications

Beyond individualized care, Prakriti has relevance for population therapeutics. By mapping constitutional prevalence within communities, healthcare interventions can be tailored at scale. For instance, in populations with a predominance of Kapha Prakriti, emphasis may be placed on obesity and diabetes prevention, while Vata-predominant communities may need greater neurological and musculoskeletal support[88].

This resonates with the goals of public health pharmacology, where drug regimens and preventive measures are optimized for specific population subgroups[89]. Prakriti-based stratification could offer a cost-effective, culturally acceptable, and clinically relevant tool for resource allocation in low- and middle-income countries.

5. Chronobiology and Temporal Health Interventions

The Ayurvedic recognition of temporal determinants (Kalanupatini Prakriti) offers insights into chronotherapeutics—the alignment of interventions with biological rhythms. Modern research shows that drug efficacy and toxicity vary depending on dosing time, due to circadian regulation of absorption, metabolism, and elimination[90].

Ayurveda's seasonal regimens (Ritucharya) and age-specific recommendations parallel current evidence that immunity, metabolism, and mood follow circadian and seasonal rhythms[91]. Integrating these perspectives may enhance adherence to lifestyle interventions and improve therapeutic outcomes.

6. Immunological Correlates of Balaniyat Prakriti

The concept of Bala (immunity and resilience) is strikingly modern in its interpretation. Ayurveda differentiates individuals as pravara bala (strong immunity), madhyama bala (moderate), and avara bala (weak), which corresponds to the spectrum of immune competence.

Biomedical studies confirm inter-individual variability in immune response due to HLA polymorphisms, toll-like receptor variants, and cytokine gene methylation[92]. Ayurveda's recommendations for Rasayana therapy (rejuvenative practices) parallel modern immunomodulatory interventions such as probiotics, micronutrient supplementation, and lifestyle modifications[93].

7. Satmya and Microbiome Adaptation

Perhaps the most innovative Ayurvedic insight is Satmya, the notion of long-term adaptation to habitual exposures. This anticipates the gut microbiome revolution in biomedical science. Long-term dietary patterns shape gut microbial communities, which in turn regulate host immunity, metabolism, and even mental health[94].

Recent research shows that traditional diets (e.g., fiber-rich Indian diets) foster microbiota diversity, while Westernized diets reduce diversity and increase chronic disease risk[95]. Epigenetic modulation by microbial metabolites (such as butyrate) further validates Ayurveda's concept that habituation shapes constitution[96].

8. Limitations of the Current Evidence

While the parallels are compelling, caution is warranted. Much of the Ayurgenomics research has been conducted on small cohorts, primarily in India, raising concerns about generalizability[97]. Additionally, Prakriti assessment remains partially subjective, depending on physician interpretation, though efforts to standardize questionnaires and digital tools are underway[98].

Epigenetic studies linking Prakriti to methylation profiles are promising but preliminary. Confounding variables such as diet, socioeconomic status, and environmental exposures remain inadequately controlled[99]. Further, integration of traditional conceptual frameworks with reductionist biomedical science risks oversimplification, potentially neglecting the holistic essence of Ayurveda[100].

9. Future Directions

To address these gaps, future research must prioritize:

1. Large-scale, multi-ethnic studies validating Prakriti classifications with genomic and epigenomic markers.
2. Standardized digital phenotyping tools for objective Prakriti assessment.
3. Integration with pharmacogenomics to explore constitution-based drug responses.
4. Longitudinal DOHaD studies linking prenatal determinants described in Ayurveda with transgenerational epigenetic mechanisms.
5. Microbiome research examining diet–constitution interactions.
6. Population-level mapping of Prakriti distributions to inform public health strategies.
7. Such research could transform Prakriti from a traditional construct into a validated biomarker of integrative precision medicine.

10. Integrative Significance

The convergence of Ayurveda and modern epigenetics offers a paradigm shift. Prakriti encapsulates the essence of systems biology, emphasizing non-linear, dynamic interactions between genes, environment, and lifestyle. By situating individuals within both biological and cultural contexts, it transcends the reductionism of modern biomedicine.

This integrative framework positions Prakriti as not merely a historical curiosity but as a living model for personalized and population therapeutics in the 21st century.

Conclusion

This narrative review demonstrates that the Ayurvedic concept of *Prakriti* is not merely a philosophical framework but a sophisticated model of human individuality with striking resonance in contemporary biomedicine. By classifying constitution into categories such as *Jatyadi, Kulaprasakta, Deshanupatini, Kalanupatini, Vayonupatini, Balaniyat,* and *Satmya-Anupatini*, Ayurveda anticipated many insights that modern science has only recently begun to articulate.

Through the lens of **epigenetics, systems biology, and precision medicine**, these categories acquire renewed meaning. *Jatyadi Prakriti* reflects genetic and gametic inheritance; *Kulaprasakta* mirrors familial aggregation and intergenerational epigenetics; *Deshanupatini* parallels geo-epidemiological and environmental health determinants; *Kalanupatini* resonates with circadian and seasonal biology; *Vayonupatini* aligns with epigenetic clocks of aging; *Balaniyat* echoes immunogenetic resilience; and *Satmya-Anupatini* anticipates microbiome-driven adaptability.

By situating health at the interface of genetics, environment, and lifestyle, *Prakriti* offers a **systems-level view of individuality**, congruent with the most advanced paradigms of personalized medicine. It provides a culturally rooted yet scientifically plausible framework for risk prediction, preventive strategies, and therapeutic decision-making. In public health contexts, mapping constitution at a population level may inform cost-effective interventions, resource allocation, and stratified therapeutic approaches—constituting what can be termed *population therapeutics*.

At the same time, caution must be exercised. While emerging evidence from Ayurgenomics and epigenetics supports the biological validity of *Prakriti*, the field is still young. Standardization of *Prakriti* assessment, expansion to multi-ethnic cohorts, and rigorous validation with molecular markers are essential for its wider acceptance in mainstream science.

The integrative potential of *Prakriti* is profound. It bridges ancient wisdom with modern discovery, reductionism with holism, and personalized care with population-level strategies. As medicine moves toward an era of **predictive, preventive, personalized, and participatory (P4) healthcare**, Ayurveda's constitutional framework may serve as both inspiration and guide.

In conclusion, *Prakriti* should be recognized as a **dynamic health determinant and a transdisciplinary research frontier**. Its convergence with epigenetics and molecular biology not only validates Ayurveda's timeless insights but also opens novel avenues for integrative medicine, precision therapeutics, and public health. This synthesis exemplifies how cross-cultural knowledge systems can enrich global healthcare, offering a vision of medicine that is deeply human, personalized, and sustainable.

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