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# ROLE OF PRAKRITI (INDIVIDUAL CONSTITUTION) IN PROGNOSIS OF AUTOIMMUNE DISORDERS: A COMPREHENSIVE REVIEW

Ayurveda

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## ABSTRACT

Autoimmune disorders represent a significant burden on global health systems, affecting approximately 5% of the population with multifactorial etiopathogenesis. While genetic predisposition and environmental triggers are well-established contributors to autoimmune disease development, individual constitutional variations play a crucial yet underexplored role in disease susceptibility, manifestation, and therapeutic outcomes. Prakriti, the Ayurvedic concept of individual constitution, represents a phenotypic framework determined by the dominance of tridoshas (Vata, Pitta, and Kapha) at conception. Emerging evidence demonstrates that Prakriti correlates with genetic polymorphisms, immune marker expression, inflammatory profiles, and metabolic pathways. This comprehensive review synthesizes contemporary research elucidating how Prakriti classification provides valuable prognostic insights for autoimmune disorder management, disease progression prediction, and personalized therapeutic interventions. Integration of Prakriti-based assessment with modern biomedical markers offers a novel paradigm for understanding inter-individual variability in autoimmune disease susceptibility and treatment response.

## KEYWORDS

Prakriti, constitutional type, autoimmune disorders, prognosis, genetic predisposition, immune markers, personalized medicine

## INTRODUCTION

Autoimmune diseases represent a heterogeneous group of conditions characterized by the breakdown of self-tolerance and inappropriate immune responses against autoantigens.[1] Disorders such as systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), multiple sclerosis (MS), and various others demonstrate considerable individual variability in disease severity, progression rates, and treatment responsiveness despite similar pathophysiological mechanisms.[2] This clinical heterogeneity has given rise to investigation into constitutional and genomic factors that may modulate disease expression and prognosis.

Modern medicine states that disease manifestation depends not only on etiological but also on host factors. The prognosis of autoimmune disorders depends on multiple variables including age at onset, duration of disease, organ systems affected, and individual immune ability.[3] However, traditional systems of medicine, have emphasized for ages that disease expression is fundamentally determined by individual constitution that is Prakriti.

Prakriti, literally meaning "nature" or "original form," refers to the inherent psychosomatic constitution of an individual determined at the moment of conception by the predominance of the three doshas—Vata (air and ether elements), Pitta (fire and water elements), and Kapha (water and earth elements).[4] According to Classical principles, Prakriti remains constant throughout life and serves as the foundation for disease predisposition, physiological characteristics, psychological behaviours, and therapeutic response patterns.[5] Recent studies on molecular, genetic and immunological levels have begun to identify the correlates and mechanisms that underlie the three constitutional types.

The correlations of constitutional medicine with modern systems biology has created an opportunity to reexamine how individual phenotypes influence autoimmune disease susceptibility and prognosis. This review analyses the evidence that Prakriti classification has a significant prognostic value for managing autoimmune disorders and suggests possible mechanisms through which the constitutional factors affect the immune system and the course of the disease.

### Theoretical Foundations: Prakriti And Disease Pathogenesis

#### Definition And Classification Of Prakriti

Prakriti is physical constitution, determined by prevalence of the tridoshas, reflected in anatomical features, metabolic capacity, psychological temperament, and disease susceptibility patterns.[6] The tridosha concept, which is absent from conventional biomedical frameworks, describes fundamental physiological principles: Vata governs movement and neurological function; Pitta regulates metabolism and enzymatic processes; Kapha maintains structure and immune homeostasis.[7]

#### Genetic Basis Of Prakriti

Ongoing research has established molecular foundations of Prakriti classification. In 2015, a genome-wide association study identified fifty-two single nucleotide polymorphisms (SNPs) that are differentially regulated in individuals with Vata, Pitta, and Kapha constitutions, confirming that these classifications have a genetic basis independent of ethnic or ancestral background.[8] Additional investigation of the CYP2C19 gene polymorphism revealed constitutional correlations with metabolic variations, suggesting that Prakriti-specific genetic architecture influences drug metabolism and therapeutic response.[9] It has also been found that the Pitta constitution is associated with the PGM1 gene (phosphoglucomutase-1), this supports the hypothesis that constitutional types have a genetic basis and genes regulate enzymatic pathways and other processes.[10]

#### Mechanism Of Disease Development Through Dosha Imbalance

Ayurvedic pathophysiology describes disease development through progressive stages of dosha aggravation and vitiation as Shatkriyakala. The first and foremost factor in the development of autoimmune diseases is the interaction between the constitutional factors and the environmental and behavioural factors. When an individual's Prakriti is exposed to incompatible environmental conditions, dietary substances, lifestyle patterns, or emotional stressors, the predominant doshas become aggravated.[11] This aggravation leads to weakening of Agni (metabolic fire), resulting in incomplete food digestion and formation of Ama (metabolic toxins).

Ama (metabolic toxins), described as improperly digested substance forming when metabolic processes are compromised, plays a crucial role in autoimmune disease pathogenesis. When Ama (metabolic toxins) accumulates in body, it clogs the srotas (physiological channels) and coats cell membranes, thereby inhibiting proper cellular communication.[12] This membrane coating prevents normal antigen presentation and impairs regulatory T cell function. In autoimmune diseases, the immune system recognizes Ama-modified autoantigens as foreign and pathogenic, leading to the aberrant immune response. At the same time, impaired immunological surveillance caused by Ama allows autoreactive B and T lymphocytes to evade the mechanisms that regulate self-tolerance.[13]

#### Immunological Correlates of Constitutional Type

#### CD Marker Expression and Immune Competence

Immunophenotyping studies have demonstrated constitutionally-

specific differences in immune cell marker expression. CD25 (activated B cells) and CD56 (natural killer cells) expression was significantly higher in Kapha than in Vata and Pitta.[14] These elevated markers in Kapha individuals correlate with enhanced capacity for adaptive immune responses and natural killer cell-mediated cytotoxicity, consistent with Ayurvedic concepts of strong immunity in Kapha types.[15]

In contrast, Vata-predominant individuals have lower CD25 and CD56 expression, suggesting reduced B cell activation capacity and natural killer cell function. This immunological pattern aligns with traditional Ayurvedic descriptions characterizing Vata as possessed of weak immunity with tendency toward inadequate immune responses, CD14 (monocyte marker) expression showed slight elevation in Pitta-predominant individuals, suggesting enhanced innate immune function and antigen presentation capacity in this constitutional type.[16]

The clinical significance of these findings extends to autoimmune disease predisposition. Vata-predominant individuals, with inherently lower baseline immune cell activation, may represent a population at risk for infections due to inadequate immune responses, yet potentially immune from some autoimmune manifestations requiring strong B and T cell activation. On the contrary, Kapha types, with elevated CD25 and CD56, have enhanced immune response capacity, which may predispose toward both effective pathogen responses and better autoimmune reactivity if there is failure in tolerance mechanisms.

### Inflammatory Marker Profiles

Recent investigations of inflammatory biomarkers shows constitutionally-specific patterns. Vata-Kapha and Kapha-predominant individuals display significantly elevated levels of interleukin-6 (IL-6), tumour necrosis factor-alpha (TNF-α), high-sensitivity C-reactive protein (hs-CRP), and HOMA-IR (homeostatic model assessment for insulin resistance), indicating systemic inflammatory load and metabolic dysfunction.[17] These inflammatory markers, recognized as contributors to autoimmune disease pathogenesis and progression, are potentially higher in certain constitutional groups.

Pitta-predominant individuals have typical inflammatory profiles characterized by elevation of alkaline phosphatase and metabolic markers reflecting increased enzymatic activity consistent with Pitta's heating and metabolic properties, these individuals may experience autoimmune manifestations characterized by acute, vulnerable presentations due to inherent Pitta qualities of intensity and rapid metabolic turnover.[18]

Vata types typically display lower baseline inflammatory markers but exhibit increased monocyte-lymphocyte ratio and IL-6, suggesting susceptibility to chronic, neural related inflammatory processes rather than acute inflammatory responses.[19] The differentiation between constitutional inflammatory patterns carries significant prognostic implications: Kapha-predominant individuals may face greater baseline inflammatory response, leading to more severe disease manifestations but better response to anti-inflammatory interventions; Pitta types may experience recurrent inflammatory intensifications requiring strategies to modulate metabolic activities; Vata individuals may develop subtle, neuromuscular autoimmune manifestations showing less obvious variations on standard inflammatory markers.[20]

### Metabolic And Endocrine Variations

Constitutional variations widen beyond immune markers to encircle broader metabolic and endocrine differences. Kapha-predominant individuals demonstrate elevated markers of metabolic syndrome including raised triglycerides, altered cholesterol profiles, and insulin resistance. These metabolic disturbances themselves encourage autoimmune activation through multiple mechanisms including altered T regulatory cell differentiation, increased Th17 response, and systemic inflammation.[21] Consequently, Kapha-predominant individuals may require assertive metabolic management as a component of autoimmune disease prevention and management.

Pitta types show raised enzymatic activity and metabolic rate, potentially leading to rapid cycling through inflammatory phases during disease occurrence and Vata types have variable metabolic markers which reflect the instability and changeability of Vata dosha.[22]

## Prakriti and Genetic Susceptibility to Specific Autoimmune Disorders

### HLA Associations and Constitutional Predisposition

Human leukocyte antigen (HLA) genes represent strongest genetic contributors to autoimmune disease susceptibility, accounting for approximately 30% of familial aggregation in SLE, RA, and other disorders, HLA associations vary across populations and likely interact with constitutional variables.[23] Pioneering study on HLA-DRB1 typing in healthy individuals classified by Prakriti revealed that certain HLA types are significantly associated with the constitutional types,this finding suggests that certain HLA variants, which are more common in certain populations, have a preferential association with the constitution types of that population.[24]

For instance, the HLA-DRB1*04:01, *04:08, *04:05, and *04:04 alleles confer the highest risk of rheumatoid arthritis in European populations by altering the binding and presentation of antigenic peptides.[25] The constitution may also be helpful in understanding why some people with pro-RA HLA alleles actually develop the disease while others do not. Vata constitution with pro-RA HLA alleles may be very different from a Kapha constitution with the same alleles in terms of actual disease manifestation and severity.

### Environmental Interactions and Epigenetic Modulation

### Nidana-Prakriti Interactions

Fundamental pathophysiology is the principle that disease develops through interaction between constitutional factors and nidanas (etiological agents). Environmental exposures-dietary patterns, seasonal changes, stress, infections, toxins, radiation-do not uniformly increase autoimmune disease risk; rather, their effect depends upon constitutional compatibility.[26] An exposure that aggravates an individual's predominant dosha creates physiological imbalance, while the same exposure may have minimal impact on constitutionally different individuals.

Vata-aggravating factors such as dry, cold, irregular, changeable conditions - increase autoimmune susceptibility in Vata-predominant individuals through dryness, nervous system sensitization, and immune dysregulation, Pitta-aggravating exposures as hot climates, excessive sunlight, caustic chemicals, emotional stress triggers inflammatory and autoimmune responses particularly in Pitta types through heat accumulation and Agni hyperactivity and Kapha-aggravating factors as damp, sedentary, stagnant conditions leads to congestion, impaired lymphatic drainage, immune dysregulation, and metabolic dysfunction in Kapha individuals through obstruction of srotas.[27]

Contemporary research confirms that pollutant exposures demonstrate dosha-specific effects. Air pollution, characterized by dryness, mobility, and penetrating subtlety, preferentially aggravates Vata through effects on nervous system, respiratory tract, and mobile tissues, water and electromagnetic field exposures demonstrate greater Pitta-aggravating effects through thermal and penetrating mechanisms while Soil and water contamination with microbial agents and persistent organic pollutants primarily disturbs Kapha through accumulated toxins and impaired elimination.[28] These differential environmental susceptibilities based on constitutional type provide monotonous understanding for well-documented phenomenon that identical exposures produce different health outcomes across populations and individuals.

### Epigenetic Mechanisms In Constitutional Disease Manifestation

Recent advances in understanding autoimmune disease genetics have revealed that identical genetic predispositions produce discrepant disease outcomes across monozygotic twins, with low concordance rates for most autoimmune conditions even among genetically identical individuals.[29] This conflictions demonstrates that genetic predisposition alone proves insufficient for disease development; epigenetic mechanisms mediating gene expression modification provide vital links between environmental exposures and genetic predisposition.

Environmental agents including viral infections, hormonal disturbances, dietary components, toxin exposures, physical activity patterns, sleep disruption, and psychological stress alter DNA methylation patterns, histone modifications, and chromatin accessibility in immune cells.[30] These epigenetic mechanisms regulate expression of immune system genes, which control differentiation of T cells, tolerance of B cells, functionality of regulatory T cells, and

production of pro-inflammatory cytokines. Prakriti also provides a framework for understanding how constitutional differences in Agni, doshic balance, and srotas integrity can create differential sensitivity to epigenetic derangement by environmental agents.

Constitutionally weak Agni particularly in Vata types, leads to impaired intestinal barrier function and dysbiosis, allowing pathogen-associated molecular patterns and microbial metabolites to trigger toll-like receptor signalling and epigenetic remodelling of mucosal and systemic immune cells.[31] Pitta-predominant individuals, with hyperactive Agni but often excessive metabolic activity, may accumulate reactive oxygen species (ROS) and lipid peroxides, causing oxidative stress-induced epigenetic alterations particularly in B and T cell genes regulating tolerance and Kapha individuals with sluggish, insufficient Agni develop accumulation of undigested Ama providing persistent antigenic stimulation and immune dysregulation.[32]

**Prognostic Framework: Prakriti-Based Disease Prediction and Course Estimation**

**Prakriti as Prognostic Determinant**

Traditional texts describe systematic prognostic assessment through evaluation of patient, disease, and environmental factors. Classical Ayurvedic principles, categorizes disease prognosis into four levels: Sukha sadhya (easily curable with good prognosis), Krichra sadhya (difficult to cure), Yapya (incurable but manageable), and Asadhya (incurable with poor prognosis).[33] Recent studies confirm that the prognosis framework, which incorporates the assessment of the patient's constitution, has better predictive value than the traditional severity scores.

Prakriti affects prognosis through multiple mechanisms - Vata-predominant individuals typically have poor tolerance for strong medicines and invasive treatments, reduced capacity for sustained therapeutic engagement, and preference for variable, inconsistent regimens-all factors contributing to poor prognosis unless treatment approaches specifically accommodate these constitutional tendencies.[34] Young Vata patients with strong willpower and excellent sensory discipline (Jitatmanaha) may achieve better outcomes than older individuals or those with weak self-regulation despite identical disease severity.

Pitta-predominant individuals generally bear excellent treatment tolerance and capacity for sustained therapeutic engagement but require careful management to prevent heat induced accumulation from intensive treatments. Kapha types perceives capacity for tolerating strong interventions and consistent treatment adherence, potentially enabling more intensive therapeutic protocols.

**Constitutional Factors In Disease Severity And Progression**

Prakriti demonstrates association with disease severity at presentation and subsequent progression patterns. Vata-predominant RA patients show greater prevalence and more aggressive joint involvement than other constitutional types. This severity likely results from Vata's inherent properties of mobility, dryness, and lightness predisposing toward rapid joint destruction and extensive polyarticular involvement. However, research suggests Vata individuals may respond more rapidly to targeted therapies addressing underlying constitutional imbalance, potentially enabling earlier disease modification than conventional approaches alone.[35]

Pitta-predominant autoimmune diseases characteristically present with acute onset, prominent inflammatory markers, and recurrent flares rather than progressive deterioration, the inflammatory intensity of Pitta creates symptomatic severity, yet may incomprehensibly respond well to anti-inflammatory interventions addressing underlying Pitta aggravation.[36]

Kapha-predominant autoimmune conditions typically involve progressive, insidious onset with accumulation of metabolic dysfunction and inflammatory burden over prolong periods. While individual flares may be less pronounced than in Pitta individuals, the chronic inflammatory background is characteristic of Kapha may lead to greater long-term structural damage and systemic complications without appropriate intervention.[37]

**Clinical Evidence And Outcomes**

**Constitutional Studies In Autoimmune Disease**

Recent clinical investigations provide evidence supporting the prognostic utility of Prakriti assessment in autoimmune disorders. Case reports of autoimmune disease management incorporating Prakriti-based Panchakarma, documents substantial clinical improvements including reductions in joint pain, swelling, and stiffness; normalization of inflammatory markers; and improved quality of life scores in RA patients.[38] A notable case of systemic lupus erythematosus with overlapping vasculitis, designated as Vatarakta according to Ayurvedic classification, demonstrated complete limb salvage and ulcer healing following constitutional Ayurvedic management, preventing recommended amputation and sustaining multi-year remission through continued constitutional therapy.[39]

**Biomarker Evidence Of Constitutional-specific Responses**

Research examining Ayurvedic treatment outcomes in autoimmune disease demonstrates biomarker changes consistent with constitutional mechanisms. In a documented case of rheumatoid arthritis treated with constitutional Virechana (Purgation therapy) plus dietary modifications and nidanaparivarjana, RA factor decreased from 94.0 IU/ml to 50.0 IU/ml; CRP decreased from 22.7 mg/L to 1.8 mg/L; and IgE decreased from 680 kU/L to normal range (53.7 kU/L) within three months.[40] Notably, symptomatic improvement was maintained for over one year with minimal requirement for continued medications, distinguishing this outcome from typical RA natural history.

Similarly, documentation of Amavata (RA) management through constitutional Shodhana (cleansing) and Shamana (palliative) therapies demonstrated substantial reductions in inflammatory markers including CRP, ESR, and RA factor concurrent with clinical improvement.[41] These biomarker changes support the theoretical mechanism of constitutional treatment in eliminating Ama and restoring immune regulation.

**Research Directions And Evidence Gaps**

Current understanding of how Prakriti influences autoimmune disease management remains incomplete. Prospective investigations are needed to determine whether constitutional classification can predict individual responses to immunosuppressive therapies (DMARDs, biologics). The interplay between constitutional type and HLA genetics warrants examination, particularly to understand disease resistance versus susceptibility patterns. Additionally, whether constitutional phenotype shapes gut microbiota, intestinal permeability, and immune tolerance mechanisms requires mechanistic clarification.

Integrated multi-centre studies combining Ayurvedic assessment with molecular markers offer a viable framework for establishing Prakriti's predictive value. Comparative research to determine if the approach based on the constitution optimizes the therapy, clinical course, and quality of life relative to the standard care is necessary to confirm the therapeutic relevance.

**DISCUSSION**

Constitutional assessment through Prakriti classification may provide a novel approach to evaluating the prognosis of autoimmune disease and its manifestation in an individual.

It is not surprising that constitutional factors, which have been shown to correlate with immunological, genetic, and metabolic aspects of a person, can predict the predisposition to autoimmune disorders.

Vata-predominant individuals have lower baseline immune system activation and are prone to autoimmune disease chronicity with neurological and musculoskeletal components , they also have lower tolerance for aggressive treatment modalities.[42] In contrast, Kapha dominant disorders co-occurs with elevated inflammatory markers and metabolic dysfunction, which leads to a more severe and progressive disease but also supports a more effective treatment.[43] Pitta autoimmune diseases have a tendency to manifest in an acute inflammatory form. The constitutional types also differ in their genetic background, immune and other markers, and epigenetic modifications.[44] While clinical evidence points to fact that constitutional management of a disease can improve biomarkers, there is still a lot of research that needs to be done to establish whether it can be used to predict the response to immunosuppressive therapies. Additionally, the mechanisms through which the constitution affects the microbiota and the establishment of immune tolerance also need to be clarified.

## CONCLUSION

Prakriti-based assessment provides significant prognostic utility for autoimmune disorder management through constitutional-specific understanding of disease manifestation, severity, and progression patterns. The integration of constitutional framework with modern biomedical markers establishes a personalized medicine paradigm offering improved therapeutic outcomes. Future prospective, multi-centre investigations combining Ayurvedic assessment with molecular markers are essential to validate clinical applicability and optimize treatment protocols across constitutional types.

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