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A Review Study of Ayurvedic Prakruti and Human Genomics

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ABSTRACT:

Ayurveda says that every person has a unique constitution, called Prakruti (constitution), composed of a balance of three energies: Vata (movement), Pitta (transformation) and Kapha (structure and lubrication). This balance influences a person's body type, metabolism, and behavior. This article looks at how the old Ayurvedic idea of Prakruti matches up with new genetic research, trying to find its biological basis. By analysing classical Ayurvedic texts and literature alongside modern genetic studies, researchers and many writers found a correlation between Prakriti and genetic links between Prakriti types and genes such as HLA-DRB1, ACE, MTHFR, PGMI, APOE, and CYP2C19. This suggests that the Ayurveda literature may come from specific genetic differences, which strongly supports Prakriti. Analysing Ayurveda with genetics could help for specific and customised, personalized medicine, where health care is based on a person's unique constitution, helping predict many diseases, prevent them using the Ayurvedic way, and tailor treatments. This blend of old and modern science offers a complete, specific, personalized approach to the health of a person and the entire healthcare system.

KEYWORDS: Ayurgenomics, *Prakruti*, Genomics, Genetics,

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INTRODUCTION:

Health status in Ayurveda is mentioned in terms of focuses on maintaining harmony of the body's vital energies to manage health and prevent disease.[1] Ayurveda aims to cure and prevent disease.[2] A fundamental principle within this Ayurvedic tradition is *Prakruti*, the individualized constitution of every person that results from the unique combination of the three Doshas—*Vata*, which is responsible for the movement and neurological activity of the body. *Pitta*, which regulates metabolism and digestion, and *Kapha*, which governs stability and lubrication.[3] This intrinsic balance determines a person's physical characteristics, psychological disposition, and susceptibility to many disorders. Ayurvedic literature, such as the *Charaka Samhita* and *Sushruta Samhita*, and *Ashtang Sangrah*, describes complete knowledge about *Prakruti*, focusing on its role in personalized diagnosis, planning of treatment, and disease prognosis. Although these concepts have ancient roots, their validation remained limited until modern advances in molecular-level biology and genomic research gave new ways to explore their biological underpinnings.[4] Genetic studies play a critical role in shaping health, influencing metabolism, immunity, neural regulation, and even individual responses to drugs—all of which parallel Ayurvedic descriptions of the functions of *Dosha*. The intersection of these insights has led to the evolution of Ayurgenomics in the Ayurvedic way, a discipline that integrates Ayurvedic constitutional theory about Prakriti with genomic science to refine personalized medicine and healthcare.[5] The present review focuses on reinterpreting classical Ayurvedic perspectives on *Prakruti*, examines recent genetic studies identifying polymorphisms linked to different constitutional types, and discusses the broader implications of these findings of study for advancing individualized medicine and healthcare.

Methods:

1. A modern science literature review was taken from databases such as PubMed, Scopus, and Google Scholar. The search strategy used keywords including *"Prakruti," "Ayurveda," "genetics," "genomic polymorphisms,"* and *"dosha–gene correlation."*
2. Publications used to include contemporary research exploring the scientific validation of Ayurvedic constitutional theory.[6]
3. Classical Ayurvedic texts such as Samhita, like *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Sangrah*, were reviewed for generating data related to *prakriti* and authenticating information about the original descriptions of *Prakruti*, factors influencing its formation, such as *dosha* predominance, parental features, seasonal changes during conception, and dietary and lifestyle determinants.
4. Peer-reviewed studies focusing on genetic associations with *Prakruti* were critically analyzed for information related to gene names, polymorphisms, sample size, study population, and methodological framework.[7]
5. Special focus was given on research work at the molecular level of biology and Ayurgenomics, which includes tools related to gene and DNA, such as single-nucleotide polymorphism (SNP) genotyping, whole-genome expression profiling, transcriptomic analysis, epigenetic modulation studies, and pharmacogenomic evaluations.[8]
6. Furthermore, studies examining information related to immune regulation, metabolic pathways, stress response to factors of the body, detoxification enzymes, and cytokine

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gene expression patterns in relation to specific *Prakruti* types were explored to establish a scientific correlation between traditional and modern frameworks.[12-14]

7. Data were qualitatively synthesized to identify emerging patterns linking *Vata, Pitta*, and *Kapha* constitutions with distinct genetic and physiological signatures, underscoring the relevance of *Ayurgenomics* in advancing personalized and preventive healthcare.[14-15]

Ancient Perspectives on *Prakruti*

The *Charaka Samhita* describes Prakruti as a balance of the three doshas at birth, which shapes body morphology, mental tendencies, metabolic rates, and disease predisposition.(16) *Vata* types are characterized by lean build, quick mental activity, and sensitivity to cold, often linked to neurological conditions.[17] *Pitta* types exhibit a medium build, strong digestion, and heat intolerance, with a tendency toward inflammatory diseases.[18] *Kapha* types display robust build, calm demeanor, and slow metabolism, prone to obesity and respiratory conditions.(19)

Perspectives on Human Genomics

Modern human genomics investigates the structure, function, and regulation of the human genome using advanced molecular biology techniques. Evidence is drawn from peer-reviewed studies indexed in databases such as PubMed and Scopus, focusing on genetic polymorphisms, gene expression patterns, and molecular pathways. Techniques, including single-nucleotide polymorphism genotyping, whole-genome expression profiling, transcriptomics, epigenetic analysis, and pharmacogenomics, are employed to understand variations in metabolism, immunity, stress response, and disease susceptibility, supporting the development of personalized and predictive healthcare approaches.

DISCUSSION:

Genetic Associations with *Prakruti* [20]

Recent genomic research has begun to validate these Ayurvedic observations by linking *Prakruti* types with specific genes:

- **HLA-DRB1 (Human Leukocyte Antigen DR Beta 1)[7]:** Prasher et al. discovered that certain versions of the HLA-DRB1 gene—known for steering immune responses and inflammation—line up closely with the Pitta Prakruti. This gene basically determines how your body recognizes and responds to anything it considers a threat, whether it's inside or out. In Ayurveda, Pitta types are famous for strong digestion, quick metabolism, and a tendency to run hot or get inflamed. The genetics back this up, showing that their immune systems really do react faster and more intensely. That's probably why people with a Pitta-dominant makeup are more likely to run into inflammatory or metabolic issues than others.
- **ACE Gene (Angiotensin-Converting Enzyme):** Association With Kapha Prakruti The ACE gene calls the shots when it comes to blood pressure, body fluids, and how stable your blood vessels stay, all through the renin–angiotensin system. Prasher's research found a clear link between certain ACE gene variations and the Kapha Prakruti. Ayurveda describes Kapha folks as solidly built, strong, slower to burn through calories, and prone to holding onto fluids. If you've got these ACE variations, you're more likely to retain water and salt, which fits right in with those Kapha traits. So, this genetic connection helps explain why Kapha-dominant people naturally show stability and endurance, and sometimes gain weight. It's a good example of how classical Ayurvedic types match up with real, measurable biology, which is what Ayurgenomics is all about.

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- **MTHFR (Methylenetetrahydrofolate Reductase):** MTHFR is basically the enzyme your body leans on to handle folate, keep methylation running smoothly, and manage homocysteine levels. Recently, Ayurgenomic researchers have noticed a pretty clear connection between changes in the MTHFR gene and people with a Vata Prakruti. If you've got a Vata constitution, you know the drill—your nervous system reacts in a flash, your digestion is unpredictable, your energy shows up and disappears whenever it wants, and your body always seems to be in flux. Honestly, these Vata traits line up almost perfectly with what happens when MTHFR isn't doing its job—extra sensitivity to stress, wild metabolism, and a nervous system that never settles down. So, it turns out this gene really does fit the Vata profile, and now there's a little science to back up what Ayurveda's been saying all along.
- **PGM1 (Phosphoglucomutase 1):** Now, PGM1 is another big player—this enzyme runs the show when it comes to glucose metabolism. It flips glucose-1-phosphate to glucose-6-phosphate and back, making sure your cells get the energy they need, when they need it. Ayurgenomics has found a link between PGM1 gene changes and the Pitta Prakruti. Pitta folks are famous for their strong digestion, steady hunger, sharp minds, and high enzyme activity—basically, everything PGM1 is all about. If you're Pitta, you burn through carbs fast, and your metabolism rarely takes a break, just like someone with well-functioning PGM1. This connection gives some real scientific weight to the Ayurvedic idea that Pittas naturally run hot, with quick digestion and a metabolism that doesn't quit.
- **APOE (Apolipoprotein E):** The APOE gene does a lot behind the scenes—moving fats around, keeping cholesterol in line, and helping out with heart health. Some APOE variants show up a lot in people with a Kapha Prakruti. If you're Kapha, you probably know the drill: slower metabolism, steady energy, and you put on weight a little more easily than most. High cholesterol and extra body fat are pretty common, too. All of this fits right in with what happens when APOE variants mess with the way your body handles and stores fat. That's why Kapha types end up facing more problems linked to obesity. So, the APOE–Kapha link actually bridges old Ayurvedic ideas and what science tells us about fat metabolism today.
- **CYP2C19 (Cytochrome P450 2C19):** CYP2C19 is one of those liver enzymes that can really make or break how your body deals with medicine. Change up the CYP2C19 gene, and suddenly people react to drugs in totally different ways—some zip through them, others take their time, and that changes both how well the medicine works and the odds of getting side effects. Ayurgenomics digs into this and finds that these gene differences don't show up the same way in everyone. In fact, Vata, Pitta, and Kapha types all process the same drug at different speeds because their bodies just work differently. Ayurveda always pushed for treatments that fit the person, not just the problem, and now we've got genetic proof to back that up. When you put together someone's CYP2C19 type and their Prakruti, you get a down-to-earth way to match medicine to their unique makeup.[16]

CONCLUSION:

Reviewing Ayurvedic texts, *Prakruti* is shown as a fundamental principle of the body, which contributes to the individual's constitution that contributing to health and disease. Research in modern science related to genetics increasingly and significantly

supports the biological and characteristic basis of *Prakruti*, with genes such as HLA DRB1, ACE, MTHFR, PGM1, APOE, and CYP2C19 showing significant and suggestive associations with types of *doshas*. This authentic association of *Ayurveda* and modern genomics, known as Ayurgenomics, introduces a novel and significant outlook for personalized medicine, as many incurable diseases are being solved by the Ayurvedic perspective, according to modern science. enabling the optimization of healthcare through genetic profiles parallel with constitutional types. Future research should concentrate on comprehensive gene and genomic studies and should conduct clinical trials to fully realize the potential of this integrative approach to *Prakriti* and genetics.

Declarations:

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