

# Cross-Disciplinary Models for Genomic Analysis of Yoga and Ayurvedic Interventions

Nagarjuna Reddy Aturi

Isha Yoga Teacher & Corporate Director, ISHA Foundation

Email ID: [emceearjun\[at\]gmail.com](mailto:emceearjun[at]gmail.com)

ORCID ID: 0009 - 0002 - 8978 - 013X

ORCID record <https://orcid.org/0009-0002-8978-013X>

**Abstract:** *Ayurveda, India's natural health care tradition, has a unique way of classifying mortal population grounded on individual constitution or prakriti. Ayurveda's tridosha proposition identifies principles of stir (vata), metabolism (pitta), and structure (kapha) as separate phenotypic groupings. Ayurveda, India's natural health care tradition, has a unique way of classifying mortal population grounded on individual constitution or prakriti. We observe biochemical and molecular supplements of prakriti and show how these differ significantly in processes that are linked to intermediate patho - phenotypes, known to take different course in conditions. The integration of information and communication technology in education is furnishing high - quality Ayurvedice - learning coffers and online courses. Development and progression of different conditions with their subtypes are allowed to depend on the origin and medium of anxiety of the doshas, and the end of remedial practice is to ensure that the doshas retain their homeostatic state. Concertedly they determine a person's introductory constitution, which is nominated their 'prakriti'. Specifically, we illustrate how a unique integrative 'Ayurgenomics' approach can be used to integrate the trisutra conception of Ayurveda with genomics.*

**Keywords:** Genomic Analysis, metabolism (pitta), Yoga and Ayurvedic Interventions, patho - phenotypes, motion (vata), structure (kapha).

## 1. Introduction

The introductory generalities of Ayurveda are five rudiments – panchabhuta – which constitute the physical macrocosm including the mortal body and three doshas (Vata, Pitta and Kapha) or indigenous types of every human. These doshas relate astronomically to the functions of stir, digestion and accretion [4]. Ayurveda takes a holistic approach to health by incorporating life and salutary recommendations along with saucos – mineral - grounded specifics. Classical Ayurvedic textbooks similar as Charaka Samhita and Sushruta Samhita describe over 700 factory - grounded drugs as well as colorful treatment protocols. As a honored system of drug, Ayurveda continues to be extensively rehearsed in India and also in several other countries. Though contemporary drug is presently the mainstream of medical practice in India, Ayurveda is considerably used side by side and remains largely popular, especially in South Asia. Prakritis are discreet phenotypes and they're determined on the base of physical, cerebral, physiological and behavioural traits and independent of social, ethnical and geographical variables. Though all three doshas live in every human being one is dominant grounded on which an existent's Prakriti is determined. The etymology of these Sanskrit terms suggests that Vata originates from movement, Pitta from digestion and Kapha from accretion. Since Prakritis uphold an existent's predilection to complaint as well as response to treatment, it's imperative in Ayurvedic practice to identify the Prakriti of a case before treatment [5].

## 2. Literature Review

**Kumar, Abhimanyu (2023)** Ayurveda is an ancient Indian system of medicine that has been practiced for thousands of years. With the advent of Information Technology (IT), there are now new opportunities to apply advanced computational techniques to various aspects of Ayurveda. This article reviews the current applications of IT in Ayurveda and their

impact on drug discovery, clinical practice, diagnosis, education, and data management. The use of computational tools is leading to new discoveries from Ayurvedic text mining, an improved understanding of Ayurvedic disease classification, as well as better diagnosis and treatment methodologies [15].

**Hongasandra Ramarao Nagendra (2021)** The present study was undertaken to investigate the effect of Diabetes - specific integrated Yoga lifestyle Protocol (DYP) on glycemic control and lipid profiles of diabetic adults. Along with the DYP intervention, the individuals residing in Chandigarh and Panchkula union territories in the northern part of India were assessed for Ayurveda - based body–mind constitutional type. Ayurveda describes body–mind constitution as “prakriti,” which has been discussed from two angles, namely physiological and psychological as body and mind are correlated. Type 2 diabetes needs a better understanding of etiological factors and management strategies based on lifestyle and constitutional factors, given its high association rate with many cardiovascular, neurological disorders, and COVID - 19 infection [13].

**Greg Gibson (2016)** Ayurveda, an ancient Indian system of medicine documented and practised since 1500 B. C., follows a systems approach that has interesting parallels with contemporary personalized genomic medicine approaches to the understanding and management of health and disease. It is based on the trisutra, which are the three aspects of causes, features and therapeutics that are interconnected through a common organizing principle termed ‘tridosha’. Tridosha comprise three ascertainable physiological entities; vata (kinetic), pitta (metabolic) and kapha (potential) that are pervasive across systems, work in conjunction with each other, respond to the external environment and maintain homeostasis. Each individual is born with a specific proportion of tridosha that are not only genetically determined

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but also influenced by the environment during foetal development [10].

**Nizamuddin, S (2015)** The practice of Ayurveda, the traditional medicine of India, is based on the concept of three major constitutional types (Vata, Pitta and Kapha) defined as "Prakriti". To the best of our knowledge, no study has convincingly correlated genomic variations with the classification of Prakriti. In the present study, we performed genome - wide SNP (single nucleotide polymorphism) analysis (Affymetrix, 6.0) of 262 well - classified male individuals (after screening 3416 subjects) belonging to three Prakritis. We found 52 SNPs ( $p \leq 1 \times 10^{-5}$ ) were significantly different between Prakritis, without any confounding effect of stratification, after 106 permutations. Principal component analysis (PCA) of these SNPs classified 262 individuals into their respective groups (Vata, Pitta and Kapha) irrespective of their ancestry, which represent its power in categorization. We further validated our finding with 297 Indian population samples with known ancestry [14].

**Marina Evangelou (2015)** Seasonal variations are rarely considered a contributing component to human tissue function or health, although many diseases and physiological process display annual periodicities. Here we find more than 4, 000 protein - coding mRNAs in white blood cells and adipose tissue to have seasonal expression profiles, with inverted patterns observed between Europe and Oceania. We also find the cellular composition of blood to vary by season, and these changes, which differ between the United Kingdom and The Gambia, could explain the gene expression periodicity. With regards to tissue function, the immune system has a profound proinflammatory transcriptomic profile during European winter, with increased levels of soluble IL - 6 receptor and C - reactive protein, risk biomarkers for cardiovascular, psychiatric and autoimmune diseases that have peak incidences in winter. Circannual rhythms thus require further exploration as contributors to various aspects of human physiology and disease [11].

#### Evidence - based medicine

Workshop of notorious scientist Archie Cochrane on efficacy and effectiveness and meta - analysis as a system of recapitulating the results of randomized trials have led to an important exploration and analysis tool in the form of 'methodical reviews', which empowered clinicians and experimenter's decision timber. These sweats eventually led to the elaboration of substantiation - grounded drug (EBM) as a new approach to bring further rational and logical substantiation for exploration - backed practice of drug. The principles of EBM consider thickness of clinical practice quality and quality of scientific substantiation to develop substantiation - grounded practice [5].

#### Genomics

The study of an individual's entire set of genes (genome), including interactions of genes with each other and with the environment.

- Relies on high - performance computing & math techniques (bioinformatics)

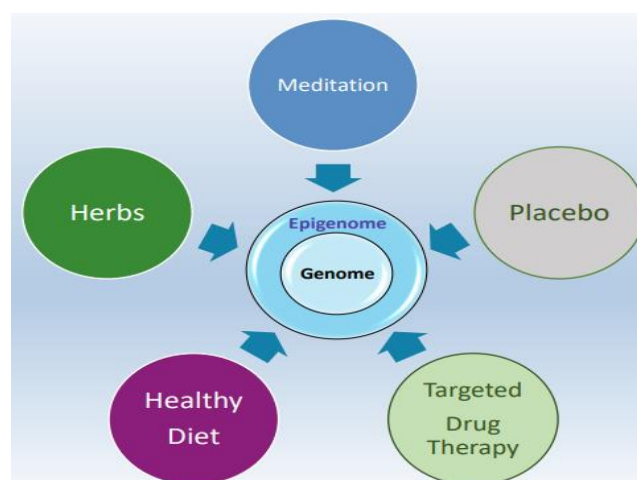
- Searches thru 3 billion DNA bases across 23K genes to find variations that affect a person's health, disease or drug response
- Discovers unique molecular profile of each person

**Epigenomics** analyses epigenetic changes across the entire DNA strand, such as histone protein modifications or methylations at C - G "islands"

**Transcriptomics** analyses expression of a gene by sequencing free - floating messenger RNA strands

**Proteomics** analyses expression of a gene by identifying & quantifying the circulating proteins made by that gene

**Metabolomics** measures all low - molecular - weight molecules that are the end - products of cellular activities and metabolic pathways governed by the genome [6].



**Figure 1:** Epigenomics: Key Pathway to Health & Healing

#### Genomic Medicine

An arising healthcare discipline that uses an existent's genomic data to support the forestalment, opinion and treatment of medical conditions.

- Inheritable threat assessment
- Early discovery
- Opinion, including subtype
- Prognostic
- Treatments

Pharmacogenomics Stem cell curatives Genome editing [9].

#### Ayurvedic Constitutional Types

##### Vata

Vata dosha in the body consists of space and air. Generally, the traits of a high Vata person would include being absent - inclined, restless, wavering, inextinguishable, and won't trust people fluently. They also have irregular eating habits, large appetite and does n't maintain specific eating times. Vata is in the tummy below the nexus, including the colon, pelvis, and pelvic organs besides shanks, skin, cognizance, nervous system, and lungs. High Vata can beget health issues like Insomnia, Headache, Loose Teeth, Facial Paralysis, Acute stress, earache, and hail diseases. A many easy life changes can help balance [10].

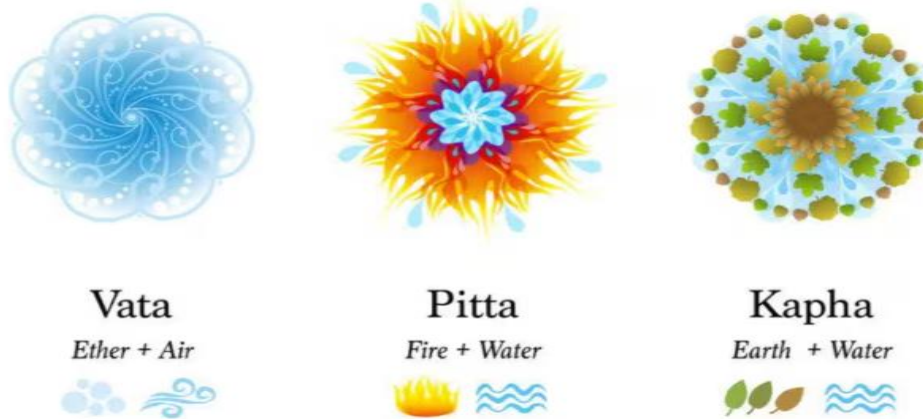


Figure 2: Ayurveda Doshas of Different Body Types

**Pitta**

Pitta dosha in the body consists of fire and water. A person with high pitta is extremely sharp and can be good with effects like mathematics and mechanics. They've brilliant memory and can flash back small details; they may have thin hair and baldness can do at a veritably youthful age. Though it's a combination of fire and water, it's further dominant with the fire element. It's boosted during summers. The seat of the pitta in the body is the small intestine, stomach, liver, spleen, gallbladder, blood, sweat glands, sub - cutaneous fat, eyes, and skin. It's responsible for stability in the body and mind. It regulates body heat, aids digestion, lightens the appetite and nourishes the body by carrying amino acids and enzymes which are important for the digestion of food [12].

**Kapha**

Kapha Dosha substantially comprises of earth and water and is the energy which forms the structure of the body. Kapha is a crucial source of lubrication for the body and keeps the joints flexible and the skin moisturized, as well as maintaining our vulnerable system. This dosha promotes love, remission and stillness so when this is imbalanced, it can lead to rapacity, attachment and possessiveness. A person with redundant Kapha can be prone to heart conditions which are associated with traffic in the highways. Doziness, cough, and respiratory diseases are a many early symptoms of imbalanced Kapha [14].

**3. Research Methodology**

Tailored salutary and herbal rules grounded on individual dosha assessments. No intervention, maintaining regular life. Collect demographic data, health history, and life factors. Cerebral Assessments is use formalized questionnaires for stress, well - being, etc. Determine the genomic goods of yoga and Ayurvedic interventions on health labels. Use a mixed - styles design combining qualitative and quantitative analyses. Grown - ups aged 21 - 60, no habitual conditions, concurrence to share. Recent use of drug that affects metabolism or gene expression. Formalized yoga practices (e. g., Vata Pitta, Vata Kapha Hatha) conducted for a specified duration. Conduct interventions over a set period. Regular check - sways to assess adherence and any adverse goods. reprise birth assessments including natural samples. Data Collection is using the same cerebral assessments aspre - intervention. insulate genomic DNA from natural samples. Sequencing Technologies is Employ coming - generation sequencing

(NGS) or genome - wide association studies (GWAS). Work with genomicists, Ayurvedic interpreters, and yoga preceptors to insure holistic understanding. Interdisciplinary perceptivity is Explore perceptivity from psychology, physiology, and traditional drug to interpret results. Bioinformatics Tools is use software for genomic data analysis, similar as variant calling, gene expression profiling, and pathway analysis. Assess correlations between genomic changes and cerebral/ health issues.

**4. Data Analysis**

**Status of Patients of Rheumatoid Arthritis**

Total 272 patients were assessed for eligibility out of which 214 patients were allocated in two different groups.152 patients were allocated in Group A whereas 62 patients were registered in Group B. Later in the study 115 patients in Group A and 42 patients in Group B completed the trial.

Table 1: All the 2 groups of the Distribution of 214 Patients

Status	No. of patients		Total	%
	Group A	Group B		
Completed	115	42	157	73.36
Dropped out	37	20	57	26.63
Total	152	62	214	100

From the above table it is evident that out of 214 patients taken for study, 80 were male and 134 were female. Incidence of disease is found notably higher in females than in males.

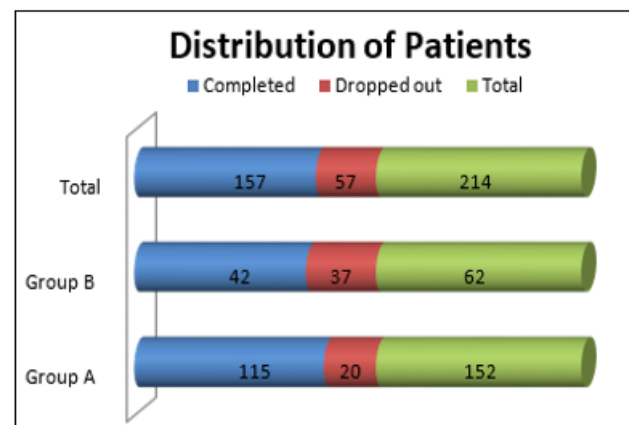


Figure 3: All the 2 Groups of the Distribution of 214 Patients

**Demographic Analysis**



**Table 2:** All the 2 Groups according to Age and Sex for the Distribution of 214 Patients

Age group in year	Male		Female		Total	
	No.	%	No.	%	No.	%
21 - 30	4	1.86	16	7.44	20	9.3
31 - 40	24	11.21	48	22.32	72	33.53
41 - 50	34	15.88	50	23.25	84	39.13
51 - 60	18	8.41	20	9.3	38	17.71
Total	80	37.36	134	62.61	214	100

This Results confirms the incidence of disease more in females than males as noted in our country. Though Amavata (Rheumatoid arthritis) affects all age groups, the maximum number of patients registered were in between 41 - 50 years of age group (39.13%) followed by 31 - 40 years (33.53%), 51 - 60 years of age group (17.71%) and 21 - 30 years of age group were having 9.3%.

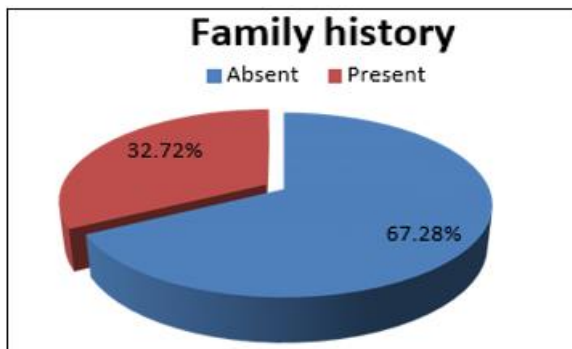
**Table 3:** All the 2 Groups according to Incidence of Deha Prakriiti of the Distribution of 214 Patients

Deha Prakriti	No. of Patient	Percentage
Vata Pitta	56	26.16
Vata Kapha	110	51.40
Pitta kapha	48	22.42
Total	214	100

Assessment of Deha Prakriti was done in all 214 patients. Dvididha Prakriti with a relative incidence of 51.40% was found in Vata Kapha, 26.16% in Vata - Pitta, 22.42% in Pitta Kapha Prakriti. No case recorded in Ek dosaja Prakriti. Thus Vata - Kapha trait appears to be more vulnerable for Amavata disease.

**Table 4:** All the 2 Groups according to Incidence of Family History of the Distribution of 214 Patients

Family History	No. of Patients	Percentage
Absent	144	67.28
Present	70	32.72



**Figure 4:** All the 2 Groups according to Incidence of Family History of the Distribution of 214 Patients

In this present study among 107 patients 70 (32.72%) patients had positive family history; remaining 144 (67.28%) patients did not have any positive family history of the disease.

## 5. Conclusions

The Ayurvedic sector should urgently fete and address the need for scientific substantiation. The good agrarian practices for procurement of raw accoutrements and good manufacturing practices for Ayurvedic medicines must agree

with the encyclopedically accepted morals. Methodical attestation, applicable methodology and rigorous trial in agreement with good practices coupled with epistemologically sensitive approaches will remain pivotal to move towards substantiated - grounded Ayurveda. Computational tools can prop opinion, treatment design, and education to truly manifest the abecedarian principles of holistic personalized care. While in the early stages, the exploration holds pledge to uncover new connections between ultramodern wisdom and ancient wisdom. With combined sweats, the Ayurveda renaissance can be catalyzed through its harmonious integration with the IT revolution. Just as Ayurveda aims to promote well - being by balancing mind - body - spirit, its reinvention for the contemporary period rests on harmonizing ancient wisdom with ultramodern computational advances for the lesser good of global health. This fosters a comprehensive understanding of how yoga and Ayurvedic practices may impact inheritable expression and overall health, encouraging farther exploration in integrative health approaches.

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