

## A new approach for an old system

### -Molecular Dimensions for Siddha genomics

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"Medicine means the prevention of physical illness;

Medicine means the prevention of mental illness;

Prevention means to avert illness;

Medicine therefore is the prevention of death."

Tirumular

One of the greatest and earliest Tamil Siddha.

Traditional Siddha medicine, which is prevalent mostly in Tamil Nadu (southeastern India), is popular among Tamil-speaking people even outside of this region. Its literature is entirely in Tamil, one of the oldest Indian languages. Unfortunately, however, no systematic attempt has been made, so far, either by Tamil savants or by Siddha medical practitioners, to render with critical evaluation even the major texts into English, the two main reasons being the enigmatic nature of the texts and of their secret and symbolic language. They are in partial bad condition and their difficult accessibility. Both Ayurveda and siddha are types of treatment system developed in India. They both depend on mainly natural remedies and exercise to prevent and treat an illness. Ayurveda predates siddha, and each was developed in two different regions of India. Ayurveda was incorporated in ancient Vedic texts, whereas siddha was written on palm leaf manuscripts in Tamil Nadu. Both believe that imbalance in the body creates an illness or disease. But the key differences being that the Ayurveda uses herbs and exercise to prevent illness. Siddha uses methods and medication, such as intense yogic practices, periodic fasting and meditation to achieve supernatural powers and immortality. In order to strengthen, the physical body and soul to attain supernatural powers and immortality. *Siddhars*, who supposedly attained supreme knowledge through this spirituality, wrote scriptures on all aspects of life, from arts to science and truth of life to miracle cure for diseases.

Ayurveda and siddha emphasize the balance of three elemental energies or humors: Vāyu / vāta (air & space – "wind"), pitta (fire & water – "bile") and kapha (water & earth – "phlegm"). They believe that an imbalance of these create a disease. The

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difference among them is that, siddha medicine recognizes predominance of vata, pitta and kapha in childhood, adulthood and old age, whereas ayurveda recognizes predominance of kapha, pitta and vata in childhood, adulthood and old age, respectively.

*Siddha medicine*" means medicine that is perfect. Siddha medicine is claimed to revitalize and rejuvenate dysfunctional organs that cause the disease and to maintain the ratio of vata pitta and Kapha. The siddha medicines given to practitioners include leaves, flowers, fruits and various roots in a mixed basis. In some extraordinary cases, this medicine is not at all cured. For those cases, they recommend taking *Thanga Pashpam* in it; gold is also added in an eating method.

According to the Siddha medicine, various psychological and physiological functions of the body are attributed to the combination of seven elements: first is saram (plasma) responsible for growth, development and nourishment; second is cheneer (blood) responsible for nourishing muscles, imparting colour and improving intellect; the third is ooun (muscle) responsible for shape of the body; fourth is kollzuppu (fatty tissue) responsible for oil balance and lubricating joints; fifth is elumbu (bone) responsible for body structure and posture and movement; sixth is moolai (brain) responsible for strength; and the last is sukila (semen) responsible for reproduction. Like in Ayurveda, in Siddha medicine also, the physiological components of the human beings are classified as vata (air), pitta (fire) and kapha (earth and water). It is assumed that when the normal equilibrium of the three humors (vata, pitha and kapha) is disturbed, disease is caused. The factors, which assumed to affect this equilibrium, are environment, climatic conditions, diet, physical activities, and stress. Under normal conditions, the ratio between these three humors (vata, pitha and kapha) i.e. :(Vadham, Pittham, Kabam in Tamil) is 4:2:1, respectively.

In the siddha medicine system, diet and lifestyle play a major role, not only in health but also in curing diseases. This concept of the siddha medicine is termed as pathyam and apathya, which is essentially a list of "do's and don'ts".

Siddha has lost its popularity after allopathic medicine was introduced, as a more-scientific medical system, even in Tamil Nadu. But, still there are a few ardent adopters or at least many people prefer Siddha for only a few diseases like jaundice. After some allopathic doctors, such as C.N. Deivanayagam, tried to popularize the Siddha system. Even a few allopathic doctors have started suggesting Siddha.

In 2012, VA Shiva Ayyadurai, a *Tamilian* and MIT systems scientist, launched an educational program for medical doctors through the Chopra Center which integrates concepts from traditional systems medicine such as Siddha, Ayurveda, and traditional Chinese medicine, with systems science and systems biology.

Systems biology is an emerging approach applied to biomedical and biological scientific research. Systems biology is a biology-based inter-disciplinary field of study that focuses on complex interactions within biological systems, using a more holistic perspective (holism instead of the more traditional reductionism) approach to biological and biomedical research. Particularly from year 2000 onwards, the

concept has been used widely in the biosciences in a variety of contexts. One of the outreaching aims of systems biology is to model and discover emergent properties, properties of cells, tissues and organisms functioning as a system whose theoretical description is only possible using techniques which fall under the remit of systems biology. These typically involve metabolic networks or cell signaling networks.

Molecular bioinformatics has acquired great importance due to its recent application in vast amount of data generated in the human Genome sequence projects. The nature and priorities of bioinformatics research and application are changing in several ways, *Viz.*, Comparative genomics, functional proteomics and structural genomics. Bioinformatics tools can be used to obtain sequences of genes or proteins of interests, either from material obtained, labeled, prepared and examined in high throughput Screening by individual research/groups or from repositories of sequences from previously investigated material. The collecting, organizing and indexing of sequence information into a Database for Data mining. The power of a Database comes not from the collection of information, but in the analysis. A sequence of DNA does not necessarily constitute a gene. It may contain several genes. PCAPSS (Protein Classification through the Assessment of Predicted Secondary Structure), BLAST Filter, SeqCheck and SEqMake are a few notable tools of Molecular bioinformatics. Such applications can be tried on the natural products to provide the most productive source of leads for new medical applications from siddha medicine point of view.

The success of natural products derives from their structural diversity, with higher plants producing secondary metabolites of greater molecular diversity than most other classes of organisms. Natural products provide greater structural diversity than any combinatorial or other practicable synthetic approach. Drug discovery has largely overcome the restrictions of working with extracts of natural products by integrating novel solid phase fractionation and chromatography technologies with screening assays specifically optimized for natural products. These are linked to mass spectrometry and nuclear magnetic resonance techniques for rapid identification of the structures of active compounds.

Currently much of the data sources required by the biologists and chemists are in different forms. The difficulty users face is in organizing these Data. At this juncture to confine the greatest achievement of bioinformatics methods one can talk about DNA bioinformatics, mRNA bioinformatics, Human Bioinformatics, Physiological bioinformatics, pathological bioinformatics Chembio-informatics and Developmental Bioinformatics. The greatest achievement of Bioinformatics methods, the Human Genome project, is completed. The Target of decoding the three billion base pairs of the human DNA has become achievable only through the use of various innovative techniques and methods evolved by Bioinformatics scientists.

KEGG (Kyoto Encyclopedia of Genes and Genomes) is a knowledge base for systematic analysis of gene functions, linking genomic information with higher order functional information. The genomic information is stored in the GENES database, which is a collection of gene catalogs for all the completely sequenced genomes and some partial genomes with up-to-date annotation of gene functions. The higher order

functional information is stored in the PATHWAY database, which contains graphical representations of cellular processes, such as metabolism, membrane transport, signal transduction and cell cycle. The PATHWAY database is supplemented by a set of *ortholog* group tables for the information about conserved sub pathways (pathway motifs), which are often encoded by position ally coupled genes on the chromosome and which are especially useful in predicting gene functions. A third database in KEGG is LIGAND for the information about chemical compounds, enzyme molecules and enzymatic reactions. KEGG provides Java graphics tools for browsing genome maps; comparing two genome maps and manipulating expression maps, as well as computational tools for sequence comparison, graph comparison and path computation. The KEGG databases are daily updated and made freely available (<http://www.genome.ad.jp/kegg/>).

Merging the Systems biology, Molecular Bioinformatics, The Human genome project, and KEGG (Kyoto Encyclopedia of Genes and Genomes), Molecular modeling, linking genomic information with higher order functional information merging with by integrating novel solid phase fractionation and chromatography technologies can really refine the perfect Medicine the Siddha in future for the better understanding of the common public and standardization on par with western medicine for their better understanding and accepting of our renowned already well established Tamil Medical system 'the Siddha medicine'.

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