

Scientific Clinically Significant Concepts of *Vayu (Vata)*

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Vayu (Vata)

Vata, Pitta, Kapha are the concepts of molecular biology of the body. If *Vayu* is equated to only neurotransmission and hormonal functions in description of Charaka cannot be accomplished. As Charaka quotes *Vastantrayantradhara*. It falls very restricted description and cannot explain all the functions or actions envisaged for *Vayu*.

Neurohormonal basis only explains the *Yantra* (mechanistic) part of the whole *Tantra Yantradhara*. *Tantradhara* relates to whole organization of the body, where seventy trillion cells perform under one unified command. Therefore, *Vata* concept probably also related with genome.

Double helix structure of DNA (Deoxy-Ribonucleic Acid) as the basic structure of genome has laid the foundation for the understanding of the basic molecular biology. Nucleic acids are also proteins. All the proteins have nitrogen. In chemistry of *Panchamahabhuta*, *Vayu* is the combination mainly of nitrogen, oxygen and other minor gases. Various biomolecules, that include gene proteins and small gas molecules e.g. NO, CO act on surface receptor of the cells to form specific receptor complex resulting into specified action depending on the type of the cells. Gene proteins or regulatory proteins act through endocrine, paracrine and autocrine mechanisms. Therefore regulating proteins also participate in the umbrella functions of *Vayu* that can satisfy the description of *Tantrayantradhara*, action of *Vayu*. Another interesting description of *Vayu* is *Rajabahulo Vayu* in Ayurveda. *Rajas* are signified by motivated action with resultant impetus the change in the type of particle motion can be compared to *rajas*. When the ultra-sound is introduced in to this solution the particles are observed to be organizing themselves into cell layers. This organizational ability is derived from the *satva guna* of Akash. Because of this, *Vata* is responsible for both structure and function of the body, as *Tantrayantradhara* description of Charaka.

Structural and functional enzyme proteins are regulated by gene proteins. Self-assembly is the property of all the biomolecules. One of the most important regulatory gene is P53. It is also known as molecular guard. It regulates the repair and the programmed death (apoptosis) of the cell.

Now looking at the description of (*Yantradhara Vayu*) functions of *Vayu*, one comes to know how the gases generated in the body and perform all the bodily functions. Many scholars tried to correlate the functions of *Vayu* with that of neurotransmitters like Acetylcholine and Adrenaline etc. But they are not gaseous in nature. So all the description of *Vayu* fits into the function of Psycho-neuro-hormonal system. A gas as a neurotransmitter can only answer the definition of *Vayu*. Latest neurotransmitter which is Nitric Oxide (NO). It is a gas produced by the endothelial cells of the vascular system and many other tissues of the body. *Vayu* can be told as the biological air, which is the combination of Nitrogen and Oxygen active by resonance factor of *Akasha*.

Different types of gases which are part of atmospheric air are O₂, CO₂, CO and nitrogen etc. Are utilized in the body for all the biological functions. L-arginine, a semi essential amino acid is substrate for the NO generation. It is synthesized by the action of different Nitric oxide synthases in different tissues of the body. In the nervous system nNOS, aNO synthases is responsible for the generation of NO. It is called gene product-1. It generates NO in neurons and glial tissues. It regulates the cerebrovascular tone and regulates the learning and memory (*Prana and Udana*) functions. The second Nitric oxide synthases is inducible iNOS which is called gene-product-2. It generates NO in Monocytes, macrophages, smooth muscle cells, cardiomyocytes, hepatocytes and mega-karocytes etc. It plays great role in maintaining the general immunity and inflammatory reaction of the body (*Samana and Vyana* functions). eNOS is the third gene product-3, which is responsible for generation of NO in the vascular endothelial cells. It determines the cerebral blood flow. NO reacts which guanyl cyclase resulting in forming of cGMP, which is the relaxant of all the smooth muscles including the sphincters in GI tract (*Samana Vayu function*). It causes vasodilatation. This action of NO is responsible for penile erection, which is the basis for the action of *-Apana Vayu* function.

Another *Vayu* is Carbon mono- oxide (CO). It is also an important neurotransmitter. Both NO and CO are different from other neurotransmitter, since both have two way actions on both afferent and efferent nerves as well on pre and post synaptic neurons. Both of them are important for the purpose of memory consolidation.

Prostaglandins are local hormones produced in almost all the tissues and body fluids in response to diverse stimuli mechanical, thermal, chemical, bacterial and hormonal etc. They are chiefly responsible for the pain sensation and inflammation. Vitiating *Vata* is the cause of pain according to Ayurvedic conceptualization. These are the concepts, suggest *VAYU* as Psycho-neuro-hormonal system.