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AUTONOMIC NERVOUS SYSTEM IN ANCIENT INDIAN SCIENCE: A VALUABLE EXPLANATION BY ANCIENT *Ayurvedic and Yogic* SCIENCE PIONEERS

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ABSTRACT:

Dating from the Vedic era the Ancient Indian science's (Including the Ayurveda and Tantric Yoga Literatures) explanation makes substantial contribution to understanding the organization and functions of the Autonomic Nervous System, which closely correlates with the Modern Neurologists explained Autonomic Nervous System organization and function. In our present study we have gone through the different Ancient Indian Science texts and after that selected the Literatures and Sanskrit Slokas which were Relevant to present day modern Autonomic neurology and then translated and explained it and after that compared it with modern Neurology, which reveals that Ancient Indian Science pioneers also have a deep accurate Knowledge about the Autonomic Nervous System.

Keywords: *Ayurveda, Autonomic Nervous System, Sanskrit Slokas, Tantric Yoga.*

INTRODUCTION

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In *Ayurvedic* classical literature, the anatomy of Autonomic Nervous System is described in different contexts at different places in gross manner. Accurate anatomy of the Autonomic Nervous System is not found in these classical textbooks. In some textbooks related to *Tantric* literature, a few anatomical details are explained. However, when it comes to physiology,

several important features and functions of Autonomic Nervous System have been explained with considerable precision. This article reviews the contemporary and ancient *Ayurvedic* literature related to the physiology of the Autonomic Nervous System.

Theory of '*Tridosha*' forms the basis of *Ayurvedic* physiology, pathology and pharmacology. Though, the term '*Dosha*' means 'the disturbing factor', it has got definite physiological importance in normal state. Basically three '*Doshas*'- '*Vata*', '*Pitta*' and '*Kapha*'- are responsible for maintenance of homeostasis in the body; and health is nothing but a state of equilibrium of these '*Tridoshas*'. Disease is manifested as a result of disturbance in the state of equilibrium among these '*Doshas*'. Among the three, *Vata* governs our activities and energies, which is responsible for initiating the all types of movements and acquiring, carrying the knowledge of different sense. '*Pitta*' is responsible for the digestion, metabolism, production of heat and other form of energies, which gives our warmth and capacity to transform substances in the body. '*Kapha*' performs the functions like protection, strength, stability and resistance. As *Ayurveda* is based on functional understanding of body, the different entities representing '*Tridoshas*'

at each level of organization can be assumed by analyzing these functions. In generalized terms, the nervous, endocrine and immune mechanisms can be equated to '*Vata*', '*Pitta*' and '*Kapha*' respectively.^[1]

Following are the important references from the textbooks that highlight the functions of *Vayu*, which in turn, are related to autonomic nervous system.

Vyana Vata makes the forceful ejection of *Rasa Dhatu* (possible from the heart). This '*Rasa*' then circulates in the whole body continuously. According to *Astanga Hrdaya*, the site of '*Vyana Vata*' is Heart. A.H.Su.12.6

Sympathetic centre in the medulla oblongata, which is concerned with the control of heart, is vasomotor centre. Hypothalamus and other cortical areas in turn influence this. Similarly, nucleus ambiguus is the parasympathetic centre.

Vyana Vata in this context is indicative of all these functional entities (Patwardhan K,2005).¹

Vyana Vata, which moves all over the body, is responsible for the circulation of '*Rasa*'

The role of the nervous system in blood circulation cannot be neglected. Both cardiac output and peripheral resistance are under autonomic control. Sympathetic stimulation can produce peripheral vasoconstriction and thus can

produce an increase in peripheral resistance. Similarly, it can produce positive inotropic and positive chronotropic effects on heart, thus producing an increase in cardiac output. Parasympathetic stimulation, on the other hand produces a fall in cardiac output and thus a fall in mean arterial pressure (Patwardhan K,2005).¹

Active site of 'Samana' is adjacent to gastro intestinal tract. It performs the functions like reception of food, its digestion through the activation of 'Agni', its division into useful and waste parts and its onward propulsion.

All these functions are those of extrinsic autonomic nerves supplying the gut and those of enteric nervous system. submucosal plexus is concerned with secretion of enzymes whereas myenteric plexus controls the peristalsis (Patwardhan K,2005).¹

Pelvic region is the site where *Apana Vata* is active. Its functions are to bring about the activities like ejaculation, menstruation, defecation, micturition and parturition.

There is enough proof to say that all these activities are influenced in one or the other way by ANS (Patwardhan K,2005).¹

Autonomic Nervous system organization in Yoga/ Tantra literature:

In the space outside the *Meru*, the right apart from the body placed on the left and

right are two *Nadis*, *Shashi* and *Mihira*. *Sira* is also known as the *Nadi*. *Mihir* or *surya Nadi* is the *Pingala*, which is placed in right side. The *Nadi Sushumna*, where substance is the *Trigunamahi*"(having three properties), is in the middle she is the form of moon, sun and fire even water also; Her body, a string of blooming *Dhatura* flowers, extends from the middle of the *Kanda* to the head, and the *Vajra* inside her extends, shining, from the *Medhra* to the head. Sympathetic nerve fibres, which are emerge from the both sides of the spinal cord, enter in their respective autonomic ganglia which are located on both sides like a chain. Ancient *Ayurvedic* and yogic pioneers named the right sided ganglion chain as the *Pingala* and left sided ganglion chain as the *Ida*. In the vertebral column the main *Nadi* which is situated like the creeper of piper retrofractum is called *Sushumna*.^{[2][3]}

Muladhar chakra have a four *dal*, *Svadhistana chakra* have a six *dal*, the *chakra* which is situated in umbilicus is known as the *Manipura chakra*, which have a 10 *dal*, *Anahata chakra* have a 12~~dal~~, which is located in heart, *Vishudh chakra* have a 16 *dal* (plexus), which is located in throat, the *chakra* which is located in between the eyebrows is called the *Agna chakra*, which have a two *dal*. Beyond this there is a lotus shaped *chakra* exist, which goes in through the foramen

magnum (*brahmarandhra*) pathway and situated there is known as the *Sahasra chakra*, which have a 1000 *dal* (*Goraksha Samhita*).^[4]

Shatchakra's explanation is found in different *Yog-saadhna* related books. Different plexus are formed in different places of our body by the specific meeting of the Ant-Lat sympathetic and parasympathetic fibres in Autonomic ganglia. Some of the *Yog-saadhna* related teachers termed the round structure which is formed by the meeting of the sympathetic nervous systems lateral fibre as a *chakra*. The meeting point of the *Ida*, *Pingala* and *Sushumna* along the *merudanda* is known as the *Chakras*. The *chakras* are also referred to as wheels, for they are the points from which many other *Nadis* radiates. When a *chakra* is open to the flow of *Prana*, then the characteristics of the *chakra* become manifests in the individual. *Ida* and *Pingala* may be taken to refer to parasympathetic and sympathetic nervous system respectively and the *chakras* to the known nerve plexi radiating from the spine. For the sake of simplicity one, associate the *Nadis* with nerves, the *chakras* with nerve plexi and *Prana* with nerve impulses.^[5]

Starting from John Woodroffe all modern scholars has regarded the six centres as same mystical structures. There is confusion, too, about the centres. The

scriptures state that the centres are in the *Sushumna* wrongly translated as the spinal cord. That is a wrong conclusion because *Sushumna* means the entire neural axis and not the anatomic Spinal cord. Artificial anatomical divisions like spinal cord are not acceptable in *Yogic* philosophy which has a functional approach, concerning itself only with the flow of nerve impulses, which is unobstructed throughout the neural axis.^[6]

The six *Chakras* can be put into one-to-one correspondence with known anatomical neural plexi having origins at known levels along the spine and both sympathetic and parasympathetic innervations. Each of this Plexus-*Chakra* is known to innervate one or more glands and/or visceral organs, just as explained by the ancient *Yogis*. They are as following.

1. *Muladhara* is the playground for *Apana Vayu* (*Jnaneshvari Gita* 6/200). The function of *Apana Vayu* is well known. They are excretion of urine, stool, semen, and foetus and sex act (*Yoga Yagnavalkyam*-4/67). The same functions are allotted to *Muladhara*. But according to modern neurology these are the reflex functions carried out through the Inferior Hypogastric Plexus. (B C Joshi, 1986).

2. The belly (*Svadhithana*) Chakra anatomically has sympathetic innervations at the L1 level, and corresponds to the hypogastric plexus encompassing the pancreas, the intestine, and the Ovaries of woman.
3. *Manipura Chakra* regarded as the Solar Plexus, which is the seat of the fire within the body.
4. *Anahata* the heart chakra of the ancients can be thought to originate in the vicinity of T1, and to sympathetically innervate the heart, lungs, thymus gland and the lymph glands. Parasympathetic branches of the Vagus nerve originate as cranial nerve 10th.³.
5. *Vishuddha* is positioned at the neck region near the spine, with its superficial activation point in the pit of the throat. As regards the site of *Muladhara chakra*, it is clearly stated to be attached to *sushumna*, below the penis and above the anus, i.e. the midperineum. There is only one nerve structure present at this site, and that is the Inferior hypo gastric plexus with all its ramifications.
6. *Ajna chakra* matches with the right and left thalami of modern anatomy, because *Ajna chakra* consisting of two petals is sited at

the highest levels in the central neural axis at tens figures breadth from the tip of nose. *Ajna chakra* receives afferent impulses from all five senses and the whole body. It is also the seat of desires, emotional feeling and sleep, all of which holds true for thalamus. Hence, physiologically *Ajna chakra* is once again identified as the thalami. *Ajna chakra* has a functionally subsidiary nerve station called 'talv' chakra situated at palate level which is depicted as the site of *jivatma* (Soul). This tallies with the vital functions of the reticular formation and the medullary nuclei, in the floor of the fourth ventricle, which structures are intimate communications and are truly responsible for maintenance of life.^{[5][6][7]}

CONCLUSION

In the present article we focused all aspects of the Autonomic Nervous system in respect to its organization and physiological explanations by various ancient Indian *Ayurvedic* and *Yogic* science pioneers and correlate it with contemporary science, however the contemporary science historians today, fully ignore the Ancient Indian science pioneers valuable contribution in Autonomic nervous system because the

language used by the ancient Indian *Ayurvedic* Science pioneers for documentation of these early textbooks is in Sanskrit, a language that is not in day-to-day use among the general population but this article somehow reveals that Ancient Indian *Ayurvedic* Pioneers had clear and deep understanding of Autonomic Nervous system.

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REFERENCES

1. Patwardhan K, 2008, Human Physiology in Ayurveda, Publisher Chaukhambha orientalia, Reprint Edition-2008, ISBN-978-817637 098-1.
2. Yati S P, 1988, Satchakranirupana, Hindi Commentary and editor Goswami Prahlad Giri Vedanth Kesari, Krishnadas Academy, Varanasi, First Edition.
3. Pandya D, 2006, Abhinav Kriyasharir, Sarasvati pustak Bhandar, Ahmedabad.
4. Benarjee A K, 1983, Philosophy of Gorakhnath with Goraksha-Vacana-Sangraha, Motilal Banarsidass Publisher.
5. Robin M, 2002, A Physiological handbook for Teachers of Yogasana, Published by Fenestra books, Printed in USA.
6. Joshi BC, 1986, Neurology in Ancient India-MULADHARA CAKRA-A physiological Reality, Indian Journal of History of science 21(2):148-178:1986.
7. Joshi BC, 1987, Neurology in Ancient India-AJNA CAKRA-A Physiological Reality, Indian Journal of History of Science, 22(4):292-319:1987.