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Review article

Comparative study of indriyas in relation to functional aspect of sense organs

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INTRODUCTION

Sense organs of the human body can be undertaken as essential aspects of human life. Our world is alive with stimuli—all the objects and events that surround us. Sensation and perception are the processes that allow us to detect and understand these various stimuli. It may seem strange to think about it this way, but we do not actually experience these stimuli directly; rather, our senses allow us to get information about aspects of our environment, and we then take that information and form a perception of the world. Sensation is the process of receiving stimulus energies from the external environment and transforming those energies into neural energy. Physical energy such as light, sound, and heat is detected by specialized receptor cells in the sense organs—eyes, ears, skin, nose, and tongue. When the receptor cells register a stimulus, the energy is converted to an electrochemical impulse or action potential that relays information about the stimulus through the nervous system to the brain. An action potential is the brief wave of electrical charge that sweeps down the axon of a neuron for possible transmission to another neuron. When it reaches the brain, the information travels to the appropriate area of the cerebral cortex. The brain gives meaning to sensation through perception. Perception is the process of organizing and interpreting sensory information so that it makes sense. Every species is adapted to sense and perceive stimuli that matter to that species ability to survive in its environment.

Ayurvedic Review

Ayurveda says that there are 11 indrias in the human body. They are – 5 gyanendrias, 5 karmendrias and mana[1]. Mana is regarded as ubhayindria because it works in between gyanendria and karmendria. The indrias of the human body plays a very vital role in carrying out day to day activities of the human body. The human being enjoys the beauty of life with the help of these indrias. Nature has provided to the human society many beautiful features without which the life would have become meaningless. Listening beautiful music's, chanting in the temple, beautiful voice of the cuckoo bird and carrying out all the physical activities as sharira chestas are some of the functional activities of the human body done by the help of indrias[2].

Ayurveda says that the indrias are panchabhautik[3]. Even though they are panchabhautik but in a particular indriya dominancy of one particular mahabhuta is more. That is why in chakshu indriya Agni mahabhuta is more, in jihvendriya jala mahabhuta is more, in ghrana indriya prithvi mahabhuta is more, in srotra indriya aakash mahabhuta is more and in twagendriya vayu mahabhuta is more. Knowledge is obtained with the help of these indrias. In our day to day life we used to come across many eventful features. Some of these features stay in our memory and some are not. Ayurveda says that the indrias of the human body able to pertain the knowledge of sabda, sparsha, rupa, rasa and gandha. The knowledge of sabda that is hearing is pertained by the help of srotra indriya. Human body used to come across many such features in day to day activities. So, it can be said that the knowledge obtained by srotra

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indriya is innumerable. This logic can be applied in case of other indrias. The knowledge obtained by these indrias is fruitful for the human being and some are not. The human being used to react in different ways depending upon the nature of knowledge. So, it can be said that innumerable knowledge are coming from different indrias in different forms bringing joy, sorrow and anger in one's life[4]. Regarding this matter acharya charaka has said that, since the reactions of a human being is innumerable depending upon the knowledge obtained by particular indriya, therefore it can be said that the knowledge is innumerable[5]. The knowledge is obtained by a human being by the conjoint action of atman, indriya, mana and vishayas[6]. The vishayas of gyanendriyas are sabda, sparsha, rupa, rasa and gandha. The human being used to come across each of these Vishay's in their day to day life. The vishay's are very essential for the life of a human being. The indrias and Vishay's works conjointly and only after that the human being respond quickly and accurately to events. Some of the features occur automatically. For example when a person is enjoying the fragrance of a rose flower for the first time then it gets stored in the memory of that person. After that, whenever such kind of particular smell the person used to get it used to recognize him the fragrance of the rose flower. When a person starts walking, he doesn't have to control his limbs and body posture. These features are applicable to all the indrias of the human being and they occur automatically. Here mana plays a very vital role in all these processes. Vivid description of mana can be found widely described in Ayurvedic literatures. Whatever the knowledge is obtained occurs by the conjoint action of indriya, indriya vishaya, mana and atman[7]. The subject matter of mana is chintyam, vichara, uhyam, dheyang and sankalpa.

1) Chintyam: - Thinking process for any relevant subject.

2) Vicharyam: - Whether the subject will be fruitful or not.

3) Uhyam: - To make a hypothesis regarding the subject matter.

4) Dheyang: - To concentrate or to pay complete attention regarding the subject matter.

5) Sankalpa: - Determining before performing the action and to reach to a final conclusion that whether the knowledge can be acceptable or not[8].

Again acharya Charaka has said that, origin of knowledge as well as speech and action occurs with the conjoint action of indriya, indriya Vishay's, mana and atman. When indriya conjoint with mana, then indriya become able to grasp the indriya arthas / Vishay's. After that the mana decides whether the subject matter is fruit full or not. After that the exact decision is taken by applying one's intellect and only after that the human being become able to speak and able to do some actions. Again, mana, the arthas of mana, buddhi (chaksur buddhi, srotra buddhi, ghrana buddhi, rasan buddhi and sparsha buddhi) and atman are regarded as the adhyatma dravya guna sangraha. The adhyatma dravya guna sangraha is responsible for the prabritti in subha vishay's and nibritti from asubha vishay's[9].

Among all the indriyas Ayurveda has given utmost importance to twacha indriya. Regarding this matter, acharya charaka says that twacha indriya is present all over the body and there is samabaya sambandha (inseparable relationship) with mana. Since twacha is present all over the body therefore by the help of sparsha indriya mana uses all the body as its functioning area[10].

Again, one more concept has been put forwarded by acharya charaka regarding sparsha indriya. He says that sparsha are of two types- one is sparsha indriya sparsha and second one is manas sparsha. These two sparsha are responsible for the development of sukha and dukha in one's life. That means the relationship between an object and sense occurs due to sparsha indriya. For example, when the ray of light enter the inner part of the eye then only a person become able to see things otherwise not. Therefore the knowledge obtained with the help of indrias occurs with the help of sparsha indriya. The knowledge obtained may be fruitful or may not be fruitful for the person. Chintan etc are regarded as the manashik sparsha[11].

Ayurveda says that human body to be made up of three types of dosas that is vayu, pitta and kapha. Among all the three dosas of the body Ayurveda has given utmost importance to vayu dosa[12]. Vayu has been included in the list of prana that is regarded as prana for the human life[13]. Vayu plays a very critical role for the development of the human body and also to give proper shape to the human body[14]. Prana, apana, samana, vyana and apana are the five types of vayu which reside in their dominant areas and carry out the activities of the human body. All the sharira chestas of the human body both internal and external are carried out by proper functioning of vayu[15]. **Prana vayu** is mainly active in sira Pradesh. It circulates in the neck and chest region. It is responsible for the dharana of intellect, hridaya, indriya and mana. Spitting, secretion of saliva, sneezing, belching,

respiration and deglutition of food substances from the mouth are the functional activities of Prana vayu[16]. **Udana vayu** is mainly active in chest region**.** It circulates in nose, umbilical region and neck region. The ability to speak, encouragement to do work, strength, immunity, color and memory are the functional activities of the udana vayu[16]. **Vyana vayu** is mainly active in heart region. Movement of vyan vayu is very fast and therefore it moves throughout the body. Circulation, contraction and relaxation of various body parts, closing and opening of the eyes and it is also responsible for the grahana of things starting from word to yawning[16]. **Samana vayu** mainly resides near the pachak agni. It circulates through the kostha region. It carries the food substances from amasaya, digest it and after that divide it into rasa, mala and mutra parts and leaves them in their respective places[16]. **Apana vayu** mainly resides in the guda region. Normally it is present in waist, vasti and uru pradesha and this vayu is responsible for the nishkramana of sukra, artava, mala, mutra and garbhasaya[16]. Ayurveda says that vayu circulates through the body and it follows its proper route to carry out the functional activity of the human body[17]. All the karyas of mana are controlled by the proper functioning of vayu[18]. Ayurveda says that the karyas of mana are the karyas of atman[19]. Subha vishaya prabritti and nibritti from asubha vishayas of mana are controlled by vayu[20]. Again, vayu is also responsible for controlling all the indriyas of the human body[20]. It is responsible for giving proper stimulation to the indriyas. It is said in ayurdeda that only after giving proper stimulation indriyas become able to perceive their vishay's[20]. Regarding vayu Susruta says that, vayu is responsible for giving chaitanya to the living creature; therefore susruta has regarded vayu as atman for the living creature[20]. Regarding prana Acharya Charaka has said that the place where prana and other indriyas reside is the uttam anga of the human body and that uttam anga is the sira Pradesh. So, from the above said phenomenon it can be ruled out how much importance has been given to vayu and its functional aspects[21].

Modern Review

The human nervous system allows us not only to interpret sensory information, but also to learn, reason, imagine, and experience emotions. In addition, the nervous system enables the body to maintain homeostasis[22].

The cerebrum is the largest part of the brain. Each cerebral hemisphere is divided into lobes, which are named for the skull bones overlying them. The **Frontal lobe** is important in the control of voluntary motor functions, motivation, aggression, mood and olfactory reception. The Parietal lobe is the principal centre for receiving and consciously perceiving most sensory information, such as touch, pain, temperature, balance and taste. The **Temporal lobe** is involved in olfactory and auditory sensations and plays an important role in memory. The occipital lobe functions in receiving and perceiving visual input and is not distinctly separate from other lobes. Its anterior and inferior portions, called the "psychic centre" are associated with functions such as abstract thought and judgment. The CNS constantly receives a variety of stimuli originating both inside and outside the body. We are unaware of a large part of this sensory input, but it is vital to our survival and normal functions.

Sensory areas of the cerebral cortex: - Ascending tracts project to specific areas of the cerebral cortex, called primary sensory areas, where sensations are perceived. Sensory fibers carrying general sensory input, such as pain, pressure, and temperature, synapses in the thalamus and thalamic neurons relay the information to the primary somatic sensory cortex. Sensory fibers from specific parts of the body project to specific regions of the primary somatic sensory cortex so that a topographic map of the body with the head most inferior, exist in this part of the cerebral cortex. Other primary sensory areas include the visual cortex in the occipital lobe, the primary auditory cortex in the temporal lobe, and the taste area in the parietal lobe.

Cortical areas immediately adjacent to the sensory areas, called association areas, are involved in the process of recognition. For example, sensory action potentials originating in the retina of the eye reach the visual cortex, where the image is perceived. Action potentials then pass from the visual cortex to the visual association areas, where the present visual information is compared to past visual experience. On the basis of this comparison, the visual association area "decides" whether the visual input is recognized and judges whether the input is significant.

Motor functions

The motor system of the brain and spinal cord is responsible for maintaining the body posture and balance, and voluntary movements. Reflexes mediated through the spinal cord and brain stem is responsible for some body movements. Voluntary

movements, on the other hand, are consciously activated to achieve a specific goal, such as walking and typing. Although consciously activated, the details of most voluntary movements occur automatically resulting from the stimulation of upper and lower motor neurons.

Motor areas of the cerebral cortex

Action potential initiated in this region control voluntary movements of skeletal muscles. Upper motor neuron axons project from specific regions of this cortex to specific parts of the body so that a topographic map of the body exists in the primary motor cortex, with the head inferior, analogous to the topographic map of the primary somatic sensory cortex. The premotor area of the frontal lobe is where motor function is organized before they are actually limited in the primary motor cortex. For example, if a person decides to take a step, the neurons of the premotor area are first stimulated, and the determination is made there as to which muscles contract, in what order, and to what degree. Action potentials are then passed to the upper motor neurons of the primary motor cortex, which initiates each planned movement. The motivation and foresight to plan and initiate movements occur in the anterior portion of the frontal lobes. It is involved in motivation and regulation of emotional behavior and mood.

Descending tracts

The descending tracts control different types of movements. Tracts in the lateral columns are most important in controlling and manipulating goal directed limb movements, such as reaching and manipulating. The lateral corticospinal tracts are especially important in controlling the speed and precision of skilled movements of the hands. Tracts in the ventral columns, such as the reticulospinal tracts, are most important for maintaining posture, balance, and limb position through their control of neck, trunk and proximal limb muscles.

Basal Nuclei

Are a group of functionally related nuclei. The basal nuclei are important in planning, organizing and coordinating motor movements and posture. Complex neural circuits link the basal nuclei with each other, with the thalamus, and with the cerebral cortex. These connections form several feedback loops, some of which are stimulatory and others inhibitory. The stimulatory circuits facilitate muscle activity, especially at the beginning of a voluntary movement, such as rising from a sitting position or beginning to walk. The inhibitory circuits facilitate the actions of the stimulatory circuits by inhibiting muscle activity in antagonist muscles. In addition, inhibitory circuits inhibit random movements of the trunk and limbs. Inhibitory circuits also decrease muscle tone when the body, limbs, and head are at rest. Disorders of the basal nuclei result in difficulty rising from a sitting position and difficulty initiating walking.

Cerebellum

The cerebellum is involved in maintaining balance and muscle tone and in coordinating fine motor movements. A major function of the cerebellum is that of a comparator. A comparator is a sensing device that compares the data from two sources- in this case, the motor cortex and peripheral structures. Action potential from the cerebral cortex descends into the spinal cord to initiate voluntary movements. Collateral branches are also sent from the motor cortex to the cerebellum, giving information representing the intended movement. In addition, simultaneously, reaching the cerebellum is action potential from proprioceptive neurons, which innervate joints, tendons and muscles and provide information about the position of body parts. The cerebellum compares information about the intended movement from the motor cortex to sensory information from the moving structures. If a difference is detected, the cerebellum sends action potentials to motor neurons in the motor cortex and the spinal cord to correct the discrepancy. The result is smooth and coordinated movements.

Pons

Several nuclei of the medulla oblongata extend into the lower part of the pons so functions such as breathing, swallowing and balance are controlled in the lower pons, as well as in the medulla oblongata. Other nuclei in the pons control functions such as chewing and salivation.

Midbrain

The two inferior colliculi are major relay centers for the auditory nerve pathways in the CNS. The two superior colliculi are involved in visual reflexes and received touch and auditory input. Turning the head toward a tap on the shoulder, a sudden loud noise, or a bright flash of light is a reflex controlled in the superior colliculi. The midbrain contains nuclei involved in coordinating eye movements and controlling pupil diameter and lens shape. The midbrain also contains black

nuclear mass called the substantia nigra which is part of the basal nuclei and is involved in regulating general body movements.

Reticular formation

Scattered throughout the brainstem is a group of nuclei collectively called the reticular formation. The reticular formation plays important regulatory functions. It is particularly involved in regulating cyclical motor functions, such as respiration, walking, and chewing. The reticular formation is a major component of the reticular activating system, which plays an important role in arousing and maintaining consciousness and in regulating the sleep wake cycle. Stimuli such as ringing alarm clock, sudden bright lights, smelling salts, or cold water splashed on the face can arouse consciousness. Conversely, removal of visual or auditory stimuli may lead to drowsiness or sleep. General anesthesia suppresses the reticular activating system. Damage to cells of the reticular formation can result in coma.

Thalamus

The thalamus also influences mood and register an unlocalized, uncomfortable perception of pain.

Epithalamus

It consists of a few small nuclei, which are involved in the emotional and visceral response to odors, and the pineal gland. The pineal gland in an endocrine gland that may influence the onset of puberty and may play a role in controlling some long term cycle that are influenced by the light dark cycle.

Hypothalamus

It contains several nuclei that are very important in maintaining homeostasis. The hypothalamus plays a very important role in the control of body temperature; rage; fear and relaxation after a meal are related to hypothalamic functions. Emotional responses that seem inappropriate to the circumstances, such as "nervous perspiration" in response to stress or hunger as a result of depression, also involve the hypothalamus[23].

Defining sensation and perception

Sensation is the process of detecting and encoding stimulus energy in the world. Stimuli emit physical energy—light, sound, and heat, for example. The sense organs detect this energy and then transform it into a code that can be transmitted to the brain. The first step in "sensing" the world is the work of receptor cells, which respond to certain forms of energy. The retina of the eye is sensitive to light, and special cells in the ear are sensitive to sound. The physical energy is transformed into electrical impulses; the information carried by these electrical impulses travels through nerve fibres that connect the sense organs with the central nervous system. Once in the brain, information about the external world travels to the appropriate area of the cerebral cortex (Halliday, 1998).

Perception is the brain's process of organizing and interpreting sensory information to give it meaning.

Bottom - Up and Top - Down Processing

Psychologist distinguishes between bottoms up and top down processing in sensation and perception. In bottom up processing, sensory receptors register information about the external environment and send it up to the brain for interpretation. Bottom up processing means taking in information and trying to make senses of it. In contrast, top down processing starts with cognitive processing at the higher levels of the brain; in top down processing we begin with some sense of what is happening and apply that framework to information to information from the world (Balaguer-Ballester and others, 2009; Johnson and Johnson, 2009). Both bottom up and top down processing take place in sensing and perceiving the world (Liu and others, 2009), and these processes work together to allow us to function accurately and efficiently.[24] The daunting complexity of the visual system is functional as well as structural. The pathways and their many ramifications are not one-way streets. Most visual areas that send output to another area also receive input from that area; that is, they have reciprocal connections. This dynamic arrangement reflects an important principle of visual perception: visual perception—in fact, all perception—is the product of bottom-up and top-down processes. Bottom up processes are driven by sensory information from the physical world. Top down processes actively seek and extract sensory information and are driven by our knowledge, beliefs, expectation and goals. Almost every act of perceptions involves both bottom up and top down processing[25].

Sensory Receptors and the Brain

All sensation begins with sensory receptors. Sensory receptors are specialized cells that detect stimulus information and transmit it to sensory (afferent) nerves and the brain (Kaltenbach. Yu, and Holland, 2009). Sensory receptors are the

opening through which the brain and the nervous system experience the world. The sensory receptors of all animal species have evolved so that animals are adapted to their environments. The sensory receptors that a bat uses to find food are very different from- but no more specialized than those that an eagle uses. Sensory receptors take in information from the environment, creating local electrical currents. These currents are graded; that means they are sensitive to the intensity of stimulation, such as the difference between a dim and a bright light. These receptors trigger action potentials in sensory neurons, which carry that information to the central nervous system. Because sensory neurons follow the all or nothing principle, the intensity of the stimulus cannot be communicated to the brain by changing the strength of the action potential. Instead, the receptor varies the frequency of action potentials sent to the brain. So, if a stimulus is very intense, like the bright sun on a hot day, the neuron will fire more frequently to let the brain to know that the light is, indeed, very, very bright. Other that frequency, the action potential of all sensory nerves are alike. The answer is that sensory receptors are selective and have different neural pathways. They are specialized to absorb a particular type of energy- light energy, sound vibrations, or chemical energy, and convert it into an action potential. Sensation involves detecting and transmitting information about different kinds of energy. The sense organs and sensory receptors fall into several main classes based on the type of energy that is transmitted. The function of these classes include:-

- Photoreception: - detecting of light, perceived as sight.
- Mechanoreception: - detection of pressure, vibration, and movement, perceived as touch, hearing and equilibrium.
- Chemoreception: - detection of chemical stimuli, perceived as smell and taste.

Each of these processes belongs to a particular class of receptors and brain processes. There are rare cases, however, in which the senses can become confused[26].

Type of Somatosensory receptors

Category	Receptor	Function
Mechanoreceptor	Pacinian Corpuscle	Fast adapting with large receptive fields for signifying the beginning and end of gross somatosensations.
	Meissner's Corpuscle	Fast adapting with small receptive fields to signify the beginning and end of fine somatosensations.
	Merkel's Disc	Slow adapting with small receptive fields to signify sustained and fine somatosensations.
	Ruffini's ending	Slow adapting with large receptive fields to signify sustained and gross somatosensations.
Nociptors	Mechanical nociceptors	Respond to strong pressure from sharp objects.
	Thermal nociceptors	Respond to burning heat or extreme cold.
	Chemically sensitive, mechanically insensitive.	Respond to extreme in pH and to irritants.
	Polymodal nociceptors	Respond to combination of mechanical, thermal, and chemical stimuli.
Thermoreceptors	Warm receptors	Respond to temperature between 30 and 45 degree centigrade.
	Cold receptors	Respond to temperatures between 10 and 35 degree centigrade.
	Muscle spindles	Measure the length and rate of stretch of muscles.
Proprioceptors	Muscle spindles	Measure the length and rate of stretch of muscles.
	Golgi tendon organs	Gauge the force generated by a muscle by measuring the tension in the tendon.

Somatic sensory signals can take two major routes to the CNS. The **dorsal column-medial lemniscal pathway** carries information about touch and vibration from the skin, as well as proprioceptive information from the limbs. The **spinothalamic pathway** carries information about pain and temperature. The projections of the two pathways are depicted to the left[27].

The Kinesthetic and Vestibular Senses

The **kinesthetic senses** provide information about movement, posture, and orientation. The Vestibular sense provides information about balance and movement. No specific organ contains the kinesthetic senses. Instead, they are embedded in muscle fibers and joints. When stretched and move, these receptors signal the state of the muscles. They involve nearly every muscle and joint in the body. Most information about the kinesthesia senses is transmitted from the joints and muscles along the same pathways to the brain as information about touch.

The vestibular sense head is tilted, moving, slowing down, or speeding up. It works in concert with the kinesthetic senses. The semicircular canals of the inner ear contain the sensory receptors that detect head motion caused when we tilt or move our heads and or bodies. This canal consists of three fluid filled, circular tubes that tie in the three plains of the body – right-left, front-back, and up-down. As you move your head, the fluid of the semicircular canals flows in different directions and at different speeds depending on the force of the head movement. Perception of the head movements and position is determined by the movements of these receptor cells. The ingenious system of using the motion of fluid in tubes to sense head position is similar to the auditory system of the inner ear. However, the fluid movement in the cochlea results from the pressure sound exerts on the oval window, whereas the movements in the semicircular canals reflect physical movements of the head and body. Vestibular sac in the semicircular canal contains hair cells embedded in a gelatin like mass. Just as the hair cells in the cochlea trigger hearing impulses in the brain, the hair cells in the semicircular canals transmit information about balance and movement. The brain pathways for the vestibular sense begin in the auditory nerve, which contains both the cochlear nerve and the vestibular nerve which has information about balance and movements. Most of the axons of the vestibular nerve connect with the medulla, although some go directly to the cerebellum. There also appear to be vestibular projections to the temporal cortex, but research has not fully charted their specific pathways[28].

DISCUSSION

Ayurveda researchers with their tiring efforts could able to rule out the importance of Indriyas. Indriyas are nothing but a beautiful gift of god without which human being might not be able to survive in this non-dynamic world. All the developments or sophistication of the human world that the human being is pursuing is occurring due to the presence of sophisticated sensory systems. This sophistication of the sensory system is nothing but an evolutionary process that improves a species chances for survival. Sabda, Sparsha, Rupa, Rasa, Gandha are the Vishyas of the Gynendriyas i.e. subjects of sensory organs. The knowledge that the human being is obtaining is occurring by the conjoint function of Indriyas, Indria vishayas, mana and atman. If the subjects of sensory organs are absent then the human being will not be able to get any kind of knowledge. Modern world also accepts the same phenomenon in the form of sensing. Sense organs detect and encode the stimulus energy and transform it into a code and transmit to the brain and when the code reaches the specific parts of the cerebral cortex that perception occurs. Only after that proper perception proper knowledge is gained by the human being. Once learned our brain used to respond automatically.

Ayurveda says that, the knowledge that is obtained the human creature used to react in different manners. Some of the knowledge brings joy and happiness and some may bring anger, rage, and sorrow in one's life. So, the human being always have a tendency towards the things which brings happiness and have the tendency to detach itself from the things which brings sorrow in one's life. These are nothing but the inner responses of the different parts of the human brain. So, it can be revealed that human being is naturally dominant in these types of responses making them to react differently on such eventful features. Chintyam, vicharam, uhyam, dheyang and sankalpam, are the subject matter of mana. That means, the human being which is regarded as the dominant creatures of this universe are progressing or prospering because of the presence of these special qualities of mana. A topographic map is produced inside the human brain and this feature helps to create proper judgments which enable a human being to respond accurately or theoretically for any eventful features in one's life. For each and every vishayas the response of the human being is different that means the mana responds in different manners for these vishayas. It can be viewed that there is always a fraction of second difference for the mana to respond at a time. If it is seen from the neurological point of view it can be assumed that there are separate pathways for all the sensory system and almost all neurons relaying information to the

cerebrum terminate in the thalamus. Another neuron then relays the information from the thalamus to the cerebral cortex and because of this reason the human mind used to respond differently in different time. Again, mana plays a very crucial role for any kinds of actions. Modern neurobiology has described the thing in the form of vestibular and kinesthetic senses. For all these features vayu plays a very critical role for maintaining proper homeostasis. Vayu is responsible for stimulating and carrying relevant information to the Uttamanga of the human body. Here Uttamanga denotes the Shira Pradesh where Prana and other indriyas reside. Without vayu no stimulations can be possible and no knowledge can be obtained. Modern neurology also accepts the same phenomenon in the form of action potential. The neural energy will have to be converted into electrochemical impulse or action potential that relays information about the stimulus through the nervous system to the brain. Vayu is responsible for controlling the mana. Whatever the functions of mana is attributed are controlled by proper functioning of vayu. So, for each and every actions of the human body whether voluntary and involuntary are controlled by all the five types of vayu and are much similar to the functioning of the vyan vayu.

CONCLUSION

The indrias of the human body plays a vital and dramatic role for the development and prosper of the human society. Each and every knowledge that the human being is gaining or obtaining is occurring with the help of these indrias. Modern science also accepts the same concept in the form of sensation and perception that allows the human society to detect and understand the various stimuli. But all the indrias work will be meaningless if vayu will not work hand to hand with these indrias. The uttam anga of the human body used to respond appropriately due to the proper functioning of vayu. Human being does not actually experience these stimuli directly. These stimuli will have to convert into action potentials that relay the information through the nervous system to the brain.

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