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# Importance of *Ghranendriya* as explained in *Ayurveda* with reference to Olfaction

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## ABSTRACT

*Indriya* word is derived from word "Indra" means *Prana*. *Indriya* are organ in the body which exhibit the sign of life or vitality. The *Panch Gyanendriya* is the *Sadhan* for the perception of *Bahyagyana*. Each sense is dominated by the 5 different elements according to *Ayurveda*; earth, water, fire, air and sky. All elements are present in each sensory experience. *Indriya* is a function that connect the individual with the outside the world, which is the strength of the body. And the power of the senses. The feeling by which the inner 'I' gets knowledge about the world around. The nose is considered the doorway to the brain, according to *Ayurveda*. So, the cleansing and caring for the nose increase the flow of *Prana* and increases energy to the head and brain.

**Key words:** *Indriya, Indriyapanchpanchaka, Ghranindriya, Physiology of Olfaction.*

## INTRODUCTION

The word *Indriya* literally means organ, sense, force, vigor.<sup>[1]</sup> In the present context, it means *Prana* or vital life force. According to *Chakrapani* the seat of *Prana* in the body is *Sneha* or *Ojas*. *Indriya* (sense organ) are said to be the *Linga* (organs) of *Prana*.<sup>[2]</sup> Sense organ help us in acquiring *Yathartha Anubhav* that is 'knowledge of an object or subject related to the particular *Indriyas* in their true and unadulterated sense, as it is.' Such a knowledge obtained with the help of *Indriyas* is called as *Pratyaksha Gyana* or *Indriya Janya Gyana*.

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*Panch Indriya Budhi's* represents association cortices of the brain. According to the *Nyaya Vaisheshik* a perception is a cognitive sense faculty and the colours, shape, sound, smell and tastes of external objects to which each of them is related. The nose is the door to consciousness and the pathway to our inner medication that are administered via the nasal passages affect the mind, *Prana Vata, Tarpaka Kapha, Sadhaka Pitta* and *Majja Dhatu*.

### *Indriya*

*Acharya Charka* defines *Ayu* that is life as a combined state of *Sharira* (body), *Indriya* (senses), *Satva* (psyche), and *Atma* (soul).<sup>[3]</sup> *Indriya* are five sense organs responsible for perception of senses. *Ayurveda* considered *Chakshu, Shrota, Ghrana, Rasna, and Sparshna* as five *Indriya*. They are situated at eye, ear, nose, tongue and skin respectively.

### *Indriyapanchpanchak*<sup>[4]</sup>

<i>Panch Indriya</i>	<i>Panch Indriya Dravya</i>	<i>Panch Indriya Adhistan</i>	<i>Panchindriya Vishya</i>	<i>Panchindriya Budhi</i>
<i>Chakshu</i>	<i>Jyoti</i>	<i>Netra (Eye)</i>	<i>Roop</i>	<i>Chakshu Budhi</i>

<i>Shrotra</i>	<i>Aakash</i>	<i>Karna</i> (Ear)	<i>Shabda</i>	<i>Shrotra Budhi</i>
<i>Ghrana</i>	<i>Prithvi</i>	<i>Nasika</i> (Nose)	<i>Gandha</i>	<i>Ghrana Budhi</i>
<i>Rasna</i>	<i>Jala</i>	<i>Jivha</i> (Tongue)	<i>Rasa</i>	<i>Rasna Budhi</i>
<i>Sparsha</i>	<i>Vayu</i>	<i>Tvaka</i> (Skin)	<i>Sparsha</i>	<i>Sparsha Budhi</i>

### Ghranindriya

When stimulus (*Gandha*), *Ghranindriya* (nose), *Mana* (mind) and *Atma* (consciousness) are in alignment i.e., in connection with each other then only there is perception of *Gandha* and generation of knowledge (*Ghran Buddhi*) about perceived.<sup>[5]</sup> *Ghrana Budhi* helps to perceive or identify different types of smell, and its functions are equivalent to the function of piriform cortex, amygdale and orbitofrontal region regions of the brain.

### Physiology of Olfaction<sup>[6]</sup>

- The sense of smell is known as olfaction. the receptor for smell is chemoreceptors located in the olfactory mucosa of the nasal epithelium. In animals, this primitive sense is well developed.
- The olfactory system is the only sensory system that does not relay in the thalamus olfactory receptors are activated only when the odoriferous substances are dissolved in the thin layer of mucus covering the olfactory epithelium and come in contact with the cilia of the olfactory receptors.
- The water-soluble odorant dissolve in the mucus overlying the olfactory epithelium to reach the cilia of the olfactory receptor.
- The lipid -soluble odorants bind to an odorant binding protein to get transported in the hydrophilic mucus and reach the receptors. The protein is secreted into the mucus by the lateral nasal gland (goblet cells and Bowman's gland).
- Cells in olfactory bulb - 1) Mitral cells 2) tufted cells 3) periglomerular cells 4) granules

Tufted and mitral cells - Excitatory cells and release glutamate.

Periglomerular cells and granules - Inhibitory cells and release GABA.

### Olfactory pathway<sup>[7]</sup>

Odour enters through nares or nostrils → Nasal cavity (olfactory mucosa) → Dissolve odor particle in mucus → And binding with GPCR(G protein couple receptor) → Activated Adenylyl cyclase → Adenylyl cyclase increase cAMP formation → cAMP opens cation channels leading to calcium influx and depolarization → Ca ions open chloride channels chloride efflux and further depolarization inside the membrane → Action potential generate → Through cribriform plate olfactory receptor neuron → Olfactory bulb → Olfactory neuron synapse with mitral and tufted cell neuron (Excitatory cells) and other olfactory neuron synapse with periglomerular cells and granules (inhibitory cells) → Mitral and tufted cell axon form olfactory tract.

1) Mitral cell - project to

- Anterior olfactory nucleus - conscious discrimination of odors
- Olfactory tubercle
- Piriform cortex
- Amygdala-Emotional response to olfactory stimuli
- Entorhinal cortex - concerned with olfactory memories

2) Tufted cells - project to

- Anterior olfactory nucleus
- Olfactory tubercle

Olfactory transduction - there are about 1000 different odorant receptors, and all of them are coupled to G-proteins.

- When the odorant binds to the receptors the G-Protein is activated that leads to opening of ion channels causing influx of calcium.
- This produces depolarization of the olfactory receptor cells leading to generation of action potentials along the olfactory nerve.

- There is a continuous background firing of impulses through the olfactory tract, and the introduction of odors increases the frequency of these impulses.
- The dendrites of periglomerular cells and granule cells spread laterally and produce inhibition of the olfactory glomeruli on which they synapse.
- Receptor cell neuron synapse with mitral cell / tufted cells in the olfactory bulb.
- Mitral or tufted cell axons form olfactory tract

#### Factors affecting olfaction

- A strong odor has a high lipid or water solubility .and quickly recognized.
- Usually, women are more sensitive to smell than men.
- When the olfactory receptors are exposed to a continuous stimulus, they adapt rapidly.

#### Reflexes associated with Olfaction

- Sniffing at arrival of a new odor.
- Salivation or gastric secretion and pancreatic secretion at the smell of food.
- Sneezing, lacrimation and, in extreme case, respiratory inhibition in response to irritant odors.
- Vomiting in response to a foul smell.

#### Functions of Nose

- The superior part of the respiratory tract (breathing).
- A passageway for air to lungs.
- Filters impurities ex. dust from inspired air.
- Warms and humidifies inspired air.
- Organ of smell.
- Aids in phonation.

#### CONCLUSION

During the process of perception, the desire for knowledge comes in *Atma*, which is then transferred

to *Manas*. *Manas* further in association with *Indriya* perceive the respective *Indriyaartha* or the object of perception. Olfactory epithelium–receptor cells supporting cells and basal cells: Receptor cells are bipolar neurons; distal process carries cilia that project into nasal cavity. Cilia have receptors for odoriferous molecules. Axons from the olfactory sensory neurons converge in the olfactory bulb to form clusters called glomeruli. Where synapses form between the terminals of the olfactory nerve and the dendrites of mitral, periglomerular and tufted cells. In humans, it increases the quality of food by recognizing its flavor, enhance social and emotional interaction by odors of perfumes, Deodorants and fragrance of flowers and enriches memory. It also has some protective functions in guiding us to avoid stale food or to go away from polluted environment.

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