

## ORIGINAL RESEARCH ARTICLE

Pharmacodynamic understanding of *Basti*: A contemporary approachGyanendra D. Shukla\*<sup>1</sup>, Shweta Pandey<sup>2</sup> and Anup.B. Thakar<sup>3</sup>

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**ABSTRACT**

*Basti* is chief *Panchakama* procedure used in *Ayurveda*. The pharmacodynamics of systemic effect of *Basti* may be understood through absorption mechanism, concept of system biology, neural stimulation mechanism, and excretory mechanism. As *Basti* is homogenous emulsion mixture of Honey, *Saindhava*, *Sneha Dravya*, *Kalka*, and decoction of crude drugs and *Prakshepa Dravya*, which is given through rectum, is absorbed, hence *Basti* is used as route of drug administration. Through rectal route large quantity of drugs can be delivered for systemic circulation and act accordingly. Concept of system biology opines that a change at cellular level of a system can bring changes in tissue, organ and system and in another system consequently & finally in whole body. As per recent advancement intestine not only is highly vascular but also highly innervated organ which forms 'Enteric Nervous System' (ENS). ENS may works in synergism with Central Nervous System of body. The cleansing action of *Basti* is related with the facilitation of excretion of morbid substances responsible for the disease process into the colon, from where it is evacuated.

**Key words:** *Basti*, Absorption, system biology, neural stimulation, excretion.

**INTRODUCTION**

*Samshodhana* is the first line of treatment mentioned in classics in various chronic and lifestyle disorder [1] then *Shamana* is suggested it shows the importance of *Panchakarma* in *Ashtanga Ayurveda*. Now as we are proceeding in 21<sup>st</sup> century, which is a world of industrialization, fast life has resulted into various life style disorders. *Basti* being the most widely used and highly effective [2] treatment modality in the *Panchakarma* [3], it is always matter of attraction of different medical systems. *Basti* (medicated enema) process is in practice since ancient time in *Ayurvedic* system of medicine for various disease of body. Imbalance of *Tridosha* is main causative factor behind all the bodily diseases. Though *Basti* is mentioned in vitiation all the *Vata*, *Pitta*, *Kapha*, *Rakta Doshika* [4] disorder but it is specially indicated for *Vatika* diseases [5]. Though effect and safety of *Basti Karma* is time tested and well established [6], but exact pharmacodynamics by which it acts is still unknown.

**Probable Mode of Action of *Basti*:**

*Panchakarma* therapies are popular in the field of *Ayurvedic* disease management. Though their effect and safety is well established by the evidence of experiences since many centuries, their mode of action in front of contemporary scientific point of view is still a question. To take *Ayurveda* to the global platform it is necessary to explain the complete pharmacokinetics of *Ayurvedic* medicines and mode of actions of available therapies. It can be understand in the following way:

1. By absorption mechanism
2. By system biology concept
3. By neural stimulation mechanism
4. By excretory mechanism

**1) By Absorption Mechanism:**

*Basti* being the most widely used and highly effective treatment modality in the *Ayurveda*, it is the prime subject of interest for modern scientific community. With this background the basic question which comes forward regarding *Basti* is,

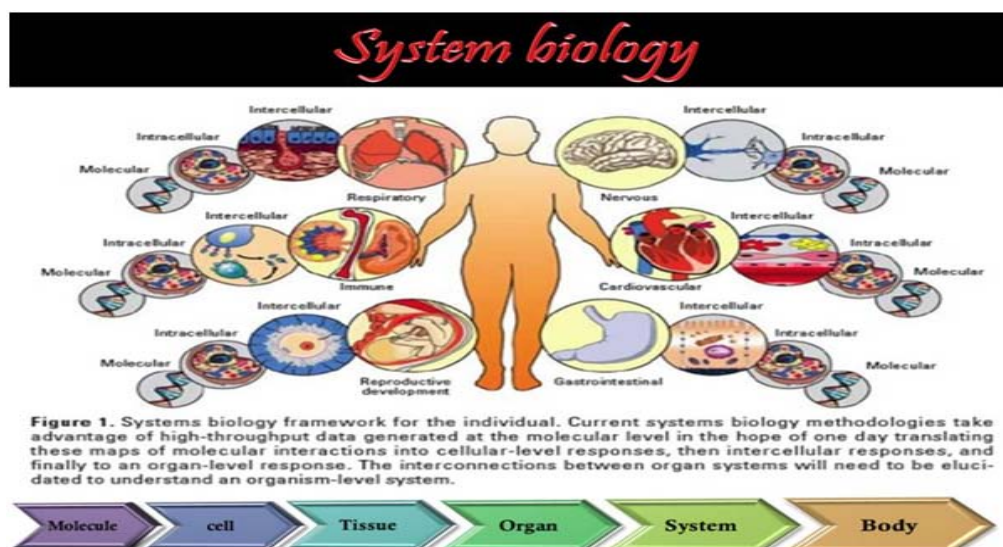
“do active principles of drugs used in *Basti* get absorbed in systemic circulation?” Considering absorption factor Swapnil *et al.*<sup>[7]</sup> carried out a study in which they have given *Triphaladi decoction Basti* containing biomarker gallic acid and after *Basti* they traced it in the circulation. The rectum has rich blood and lymph supply and drugs can cross the rectal mucosa like other lipid membrane. Thus unionised and lipid soluble substances are readily absorbed from the rectal mucosa. Small quantity of short chain fatty acid fatty acids, such as those from butterfat are absorbed directly into portal blood rather than being converted into triglycerides. This is because short chain fatty acids are more water soluble and allow direct diffusion from the epithelial cells into capillary blood of villi. However decoction *Basti* gets a very little time maximum 48 minutes<sup>[8]</sup> to absorb from colon and rectum how so ever these areas have very large surface area and highly vascular needed for absorption. Retention time for *Anuvashana Basti* is relatively more so probability of absorption also increases. *Anuvasana Basti* after reaching in the rectum and colon causes secretion of bile from gall bladder which leads to the formation of conjugate micelles which is absorbed through passive diffusion. Especially short chain fatty acid present in *Sneha* of *Anuvasana Basti* may absorb from colon and large intestine part of gastrointestinal tract and break the pathology of disease. In *Basti Karma*, a homogenous emulsion<sup>[9]</sup> of Honey, *Saindhava*, *Sneha Dravya*, *Kalka*, and decoction mixed in remarkable combination after proper churning (break the large and middle chain fatty acid into

Figure 1:

small chain fatty acids) is given which facilitates absorption better than a single drug per rectum. In *Ayurveda classics*, various *Basti Dravya* are mentioned in diverse proportion in different diseases, it again confirms pharmacodynamics of *Basti* through absorption mechanism.

## 2) By System Biology Concept<sup>[10]</sup> [Figure 1]

The latest concept of system biology makes this clearer how *Basti* can act on the various systems. This theory believes that all the organs are interconnected at molecular level. Any molecular incident is transformed at cellular level, then tissue level and ultimately at organ level. Each molecule of the body is in contact with another molecule of body directly or indirectly, if we alter the pathophysiology at one level results into changes in pathophysiology at another level. Thus, whatever the effects of *Basti* are on Gastro intestinal system, it will definitely affect another systems and helps to achieve the bodily internal homeostasis. Ulcerative colitis is a good example to understand functioning of system biology. Colon has a large number of bacterial floras which bestow the body by producing certain factor of the ‘B’ group of vitamins and ‘K’. It has shown that this flora flourishes abundantly on administration of *Sneha Basti*. May be the fact in it, provide a favourable environment for their growth and help in healing up of intestinal ulcer by providing a coat in one hand while it normalises appetite, digestion, and absorption function of gastrointestinal tract in other and also relives psychological features along with it. By this concept we can justify systemic effect of *Basti* without being present in circulation.



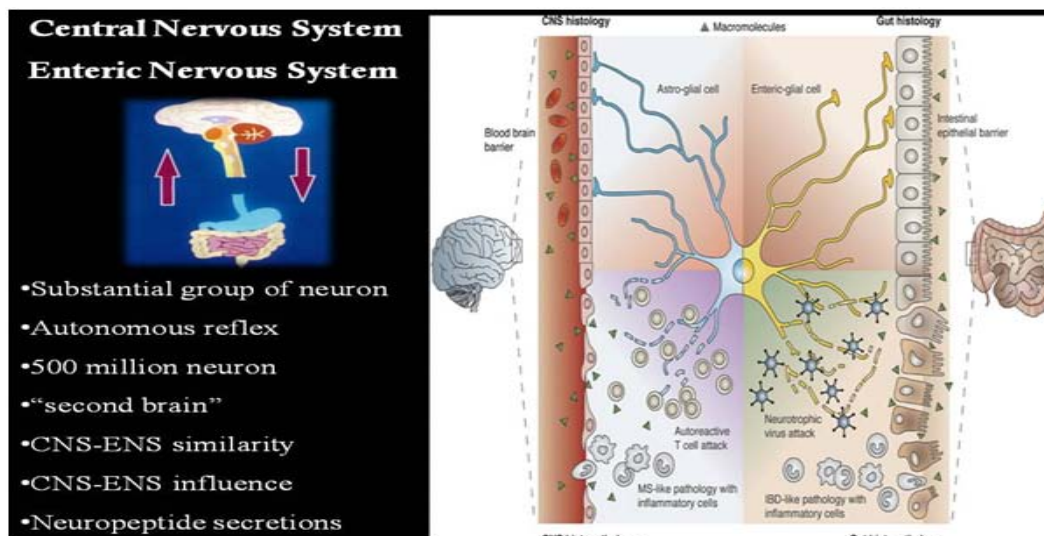
## 3) By Neural Stimulation Mechanism<sup>[11]</sup> [Figure 2]

The gastrointestinal system has a network of nerve fibers, which is known as ‘Enteric nervous system

(ENS). Similar to brain ENS sends and receives impulses, record experiences and responds to various stimuli. Its nerve cells are bathed and influenced by same neurotransmitters. Gut brain

(ENS) is located in the sheaths of tissue lining the oesophagus to colon. Considered a single entity, it is a network of neurons, possessing neurotransmitters and proteins that zap messages between neurons regulates functioning of body like those found in brain proper and a complex

Figure 2:



ENS is loosely connected with central nervous system (CNS) through vagus nerve and can mostly function alone, without instruction from top. Internal viscera are again highly supplied with nerve fiber of Autonomic Nervous System which in turn has connection with CNS. Details of how the enteric nervous system mirrors the central nervous system have been emerging in the recent years, according to Dr. Mivhael Gershon, professor of anatomy and cell biology at Columbia Presbyterian medical center in New York. He is one of the founders of new field of medicine called “Neurogastroenterology”. The gut contains 100 million neurons, more than that of in the spinal cord. Major neurotransmitters like serotonin, dopamine, glutamate, norepinephrine and nitric oxide are in the gut. Also two dozen small brain proteins, called neuropeptides are there along with the major cells of immune system. The brain sends signals to the gut by talking to a small number of ‘command neuron’ which in turn sends signals to the gut interneuron that carry up and down the pike. Both command neurons and interneurons are spread throughout the two layers of the gut tissue called ‘myenteric plexus and the submucosal plexus’. Command neurons control the pattern of activity. The vagus nerve only alters the volume by changing its rate of firing.

ENS works in synergism with the CNS. Stimulation with *Basti* (either by chemo or mechano receptors) may lead to activation of concerned part of CNS which precipitates result

circle that enables to act independently, learn, remember and produce gut felling. The gut’s brain reportedly plays a major role in human happiness and misery. Many gastrointestinal disorders like colitis and irritable bowel syndrome originate from problems within gut’s brain.

accordingly. Again it is not mandatory for a drug to stay in long time contact to the receptor e.g. like in Proton Pump inhibitor where drug interact and flush out from circulation, it is known as “HIT AND RUN MODULE” of pharmacodynamics. Same module of pharmacodynamics may be hypothesised for *Niruha Basti*.

There is close resemblance in the functioning of *Vata Dosha* and nervous system and *Basti* is prescribed as the best remedy for *Vata*. It again validates the efficacy of *Basti karma* on nervous system.

#### 4) Excretory Mechanism:

*Niruha Basti* is hyper osmotic solution which causes movement of solvent from cells of colon to the lumen containing *Basti Dravya* facilitates the absorption of endotoxin and produce detoxification during elimination<sup>[12]</sup>. Kalka used in the *Basti* has got irritant property along with other ingredients which may induce colonic distention. The distention stimulates pressure which produces evacuatory reflex. The sigmoidal, rectal and anal regions of large intestine are considerably better supplied with parasympathetic fibers than other part of intestine; they are mainly stimulatory in action and function especially in defecation reflexes. A volume of about 100 cc of gas is estimated to be present in the tract which is readily expelled by *Basti*<sup>[13]</sup>.

The administration of *Niruha Basti* shows a decline in the pyruvic acid level which results in higher vitamin B<sub>1</sub> level. Moreover a reduction in

the B<sub>1</sub> level leads to degeneration of myelin sheath, neurological disorders and ailments of the digestive system.

### CONCLUSION

The active principles of the *Niruha Basti* drugs may be absorbed by active transport and diffusion because they are mainly water soluble whereas *Sneha Basti* and other nourishing *Basti* contain hypo-osmotic solution facilitating absorption into the blood. All the cells/ tissue in the body are inter connected, *Basti* by eliminating morbid content of large intestine will definitely put a positive impact on the other system of body help in maintaining health as whole. Neurogastroenterology helps us to understand relation between gut's brain and CNS by this we can explore systemic effect of *Basti* easily. The cleansing action of *Basti* is related with the facilitation of excretion of morbid substances responsible for the disease process into the colon, from where it is evacuated. Pharmacodynamics outcome of *Basti Karma* may be due to functioning of the one or combined effect of all the four mechanism.

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