

An Integrative Review About The Physiological Activity Of Saman Vata In Special Reference To Grahani And Gastrointestinal Tract (GIT)

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Abstract

Background: According to Sushruta, the definition of healthy indicates, the position of Dosha, Agni, Dhatus, Mala and other physiological systems, in the state of homeostasis and the soul, sense and mind in state of equilibrium. Further, the Saman Vata possesses its Seat in koshta (Gastrointestinal Tract) and performing the activities like Grahana, Pachana, Vivechana, and Munchana of Anna (food). In Ayurveda, the position of Saman Vata is stated in the area of Agni and Grahani which correlates with the digestive fire or metabolism and control the bowel movements of the entire tract of the intestine, i.e., Gastrointestinal tract (GIT).

Methodology: The present review is detailed with the integration of ancient Ayurvedic text books, literatures, modern scientific literatures, published research articles and relevant online material (PubMed, Scopus, Web of Science) to understand the physiological role of Saman Vata in special reference to Grahani for proper evaluation of steps of Digestion and its physiological activity in the sympathetic and parasympathetic neural conduction of ENS and ANS GIT, as defined in modern science literatures and well understood in parallel contemporary biomedical science of Gastroenterology.

Result: The main functions of Saman Vata deals with the activation of the Agni to elucidate digestion, resulting in the catabolic activity of digestion and facilitating the Gut movement of lumen in collaboration with excretion. Specially, the similarity of Saman Vata can be mirrored with the stimulation of Enteric Nervous System (ENS) and Autonomic Nervous System (ANS) across the wall of intestine, which activate the entire Gastrointestinal tract (GIT) via its parasympathetic and sympathetic pathways.

Discussion: The contemporary review of the activities of Saman Vata with Grahani and GIT, opens new area for integrative research scholars and practitioners. It greatly focused over the showcasing of keeping Saman Vata in normal condition to perform the optimum digestive activities and well-being. The functions of Saman Vata, coordinate and maintain the harmony with various metabolic activities like digestion, catabolism, absorption, excretion and various other activities of Gastrointestinal tract (GIT) in collaboration with Enteric Nervous System (ENS) and Autonomic Nervous System (ANS).

Keywords: Saman Vata, Grahani, Agni, GIT, ENS, ANS, CNS.

Introduction:

According to Sushruta, the definition of healthy indicates, the position of Dosha, Agni, Dhatus, Mala and other physiological systems, in the state of homeostasis and the soul, sense and mind in state of equilibrium ^[1]. In Ayurveda, Dosha, Dhātu, Mala and Agni, are the main constituents of the human body in controlling the metabolic functions at cellular level. The way like Soma, Surya and Anila, adopt the functioning of nature's body by its actions like Visarga, Aadana and Vikshepa respectively, in the same way Kapha, Pitta and Anila adopt the physiological functioning of human body ^[2]. According to Charaka, Agni is treated as the main seat for digestion and responsible in the maintenance for all the physiological and pathological functions. According to Charaka, the working site (Sancharsthana) of Agni, is known as "Grahani" because it collects and keeps the ingested food till the completion of digestion in small intestine. The main responsibility of Grahani is to nourish Agni, for optimum digestion of food and to support Saman Vata in its activity of digestion and transportation of excretory products towards Pakwashaya (Anus), in harmony with ENS and ANS.

The Saman Vata is positioned near the Grahani and holds the responsibility of maintaining the balanced position of Agni i.e., Samagni to process Anna Pachana along with the activity such as Grahana, Pachana, Vivechana, and Munchana of Anna Dravya. Its working site (Sancharsthana) or effective area, is Koshta (Gastrointestinal Tract). In Ayurveda, the position of Saman Vata is indicated in the area of Agni and Grahani which correlates with the digestive fire or metabolism and control the bowel movements of the entire tract of the intestine, i.e., Gastrointestinal tract (GIT) ^[3]. It helps in maintain the functions of process such as digestion, secretion of digestive enzymes, absorption

of absorbable essence, Gut motility to promote the elimination of excretory waste out of body via Srotasa (Tract). The functions of Saman Vata are closely linked with neural activity of sympathetic and parasympathetic nervous system across ENS and ANS in the GIT. The bowel movement in GI tract, are maintained ENS through its Auerbach's plexus or Myenteric plexus and secretory function across Lumen with constriction of blood vessels of GI tract controlled by Submucous plexus or Meisner plexus, which are actually the part of intrinsic and extrinsic nerve supply. The word "Grahani" classifies as the part of the small intestine at the C - Shaped duodenum, which is also referred as the working site (Sanchasthana) of Agni. The ingested food is stored and remained at the portion of duodenum till the mixing of Pancreatic juices and Bile Juices from Liver till its function of chemical digestion. The ingested food is not forced next towards the next stage or level of the small intestine until the completion of its digestion, so it is known as "Grahani" ^[4]. The Grahani, is the actual site or place from where the core digestion process initiated, starting from the mouth, esophagus, stomach and small intestine, across the entire tract of GIT (Annavaaha Srotasa), where the term "srotasa" means a tract or tube and "Anna" refers for the food particles. The distal part of GIT includes the large intestine, rectum and anus, is referred as "Purishavaha Srotas" in Ayurveda. The faces or stools or excretory part of digested food, which is eliminated after completion of digestion is termed as "Pureesha". Both "Annavaaha Srotas" and "Purishavaha Srotas" constitute the complete Gastrointestinal Tract (GIT) and referred as Mahasrotas in Ayurveda.

Methodology:

This review is dealing with the integrative compilation of ancient Ayurvedic text books & literatures, modern scientific text books & literatures, published research articles and contemporary online material form journals (PubMed, Scopus, Web of Science) to understand the functional part of Saman Vata in the Grahani for detailed understanding of Digestion and metabolism with physiological activity of ENS and ANS in the lumen of gut through its sympathetic and parasympathetic neural supply in GIT, as described in classical Ayurvedic literatures and parallel contemporary biomedical research sciences.

In modern parameters, integrative and relevant scientific research literature was obtained from research publications mentioning the process of Digestion, metabolism, immunity, homeostasis ENS, Gut-brain axis, sympathetic and parasympathetic neural system ANS and Gastrointestinal tract (GIT). These research areas were compiled to get the detailed knowledge about digestion physiology, Gut-brain axis and their role in formation of Gastrointestinal disorders. More emphasis is drawn over comparing the physiological process of digestion, Gut signaling and ENS-ANS interactions, intestinal motility, bowel movements rather on merely understanding the physiology of GIT only.

The said review doesn't follow PRISMA guidelines, since it is purely literary and hypothetical in description.

Neither any clinical nor any experimental or lab-based investigation or examination were performed during the course of study. This present review work does not attract any primary data collection, meta-analysis, patient outcomes, or any sort of statistical representation. Since, it purely conceptual and academic based research work focused on further hypothetical and integrative research extension in the field of ancient Ayurvedic and integrative Gastrointestinal biomedical science of modern era.

Review of Literature:

Agni

According to Ayurveda, Agni is maintaining all the constituents of body like strength (Bala), complexion (Varna), health (Swasthya), enthusiasm (Utsaha), body development (Upachaya), complexion (Prabha), immunity (Ojas), vitality (Tejas), age (Vaya) and even life itself (Ayu). The balanced condition of Agni conducts the proper digestion of food, delivering the essential micro-nutrients required for routine maintenance and nourishment of the body's tissues (dhatus), and contribute towards the overall health and vitality of body. The diminished or vitiated condition of Agni disturbs the digestion of food and hence, the assimilation of essential micro-nutrients, resulting improper health and malnourishment of body's tissues (dhatus). According to Sushruta, Agni is said or placed equivalent to God since it exhibits the miraculous performance in transformation of the metabolic activity of the body's tissues (dhatus) ^[5]. According to Astanga Samgraha, the Agni in Grahani with its excellent presence of tejas element without its liquid quality, referred as 'Anala' due of its ability of Paka or digestion ^[6].

In Modern science, various types of digestive secretion, enzymes and juices, are released in the GIT, which are responsible for conducting the physiological process of metabolic activity of modifying the higher complex food particles into their simpler units like Protein into amino acid, carbohydrate into glucose and fats into fatty acid and glycerol, so that simpler molecules may be assimilated in intestine easily ^[7]. Similarly, there activity can be correlated as –

- a) Various other factors (Agni) – stimulate the inactive enzymes in liver into an active form of enzymes to facilitate the process of digestion.
- b) Vagus nerve (Saman Vata) – After ingestion of food, it stimulates digestive enzymes (Agni) to complete the process of digestion and thus, metabolism occur.
- c) After ingestion of food (Apana Vata) – the stretch nerve receptor stimulates a spate of digestive secretion, necessary for the catabolic activity of food.

Agni and Saman Vata

According to Charaka, the Agni is treated as more than just regulator of digestion, it is actually the Bio-transformer of Body tissues. In Ayurvedic, the term 'Sama' is frequently used with 'Agni' referred as "Samagni" in collaboration with Saman Vata, mentioning the correlation of Saman Vata with Agni, since it helps or maintain the balance of Agni in the direction of proper digestion. If Saman Vata keeps itself at its natural position i.e., in the naval region, the Agni remains in its natural balanced position ^[8]. but, if Saman Vata, is vitiated or disturbed from its natural position, immediately the effect over the activity of Agni can be asessed in reference to its performance ^[9]. The vitiated Agni (digestive enzyme secretions) disturbs the food digestion, resulting in limited food absorption and irregularities at tissue level. Agni integrate with Saman Vata for proper assimilation of digested food, ensuring proper digestion and maintains tissue balance ^[10]. Therefore, the position of Agni must be kept in its natural or balanced position, dully supported with Saman

Vata, for proper maintenance of tissue balance resulting optimum Digestion and metabolism.

Saman Vata:

According to Vagbhat, Saman Vata is controlling the complete process of digestion, like ingestion (Grahana), digestion (Pachana), assimilation (Vivechana) and even excretion (Munchana) in collaboration with Apana Vata. This entire process of converison of ingested food into ready essence for assimilation, is known as "Pachana" or Digestion. The position of Saman Vata is detailed near to Agni at its Sancharsthana (effective area) as Kostha (Gastrointestinal Tract) ^[11]. It functions in collaboration with Pachkagni to perform functions like Grahana, Pachana, Vivechana, and Munchana of Anna Dravya ^[12]. In modern science, the chemical secretion, enzymes, hormones, neural system, are the supportive components of the digestion in GIT. In the process of digestion, the role of Saman Vata, is well mentioned in the regulation of Agni and further assimilation of digested food particles, further supported by the process of micturition and excretion in the effective area of GIT in collaboration with the ENS. The ENS plays important role in effective functioning of small intestine, since it stimulates the intestinal secretion and bowel movements in response to nerve conduction received across the GIT. It is well evident that there are roughly 100 million of Neurons involves in the nerve conduction through ENS in response to the stimuli received across the reflex pathways, which is stimulated via the activity of sensory receptors like stretch receptors and chemoreceptors. The sensory neural system of these signal receptors, is embedded within the wall of intestine coordinating with the central nervous system (CNS) and autonomic nervous system (ANS) through physiological activity of its sympathetic and parasympathetic nerve fibres, exerting contraction and distension of bowel movement in Gastrointestinal Tract.

Grahani:

According to Vagbhata, Grahani is named as the Sixth Pitta Dhara Kala, which is mentioned between Pakwashaya (the intestine) and Amashaya (the stomach), as the central site of internal digestion ^[13]. According to Ayurveda, Grahani is considered as the specialized part or portion of Mahasrotas (Alimentary canal). According to Sushruta, Kshudranta (small intestine) is the organ which integrated anatomically with Grahani, which is situated anterior to the Amashaya (stomach) and posterior with Pakwashaya (colon). According to the working area of Saman Vata, it facilitates the process of Ahara Pachana, and situated in the small intestine or Grahani ^[14]. The food particles withhold in the Grahani till the final action of Agni Mahabhuta and the activity of digestive enzymes and chemical

secretion in digestion. According to Ayurveda, Grahani and Agni in collaboration with Saman Vata, exhibit the Adhara Adheya Sambandha. Because, it sustained and withholds the passage of ingested food from stomach into small intestine, to complete the process of digestion, that's is the reason it is called as Grahani i.e., organ which has ability to withhold or sustain the food till completion of digestion. The Agni also functions as the bio-transformer of this entire metabolism at the site of Grahani ^[15]. In modern medicine, Grahani is correlated with small intestine, where finally the bile juice from liver and pancreatic juices from pancreas, secrete their digestive enzymes into the ingested food in small intestine. This entire process of digestion is mirrored with the activity of Saman Vata inside Grahani. The major part of digestion completed in the small intestine only. The excretory or waste food part which remains after the complete digestion and separation of essence part, is sent from the small intestine to the large intestine for excretion.

Functions of the Saman Vata

In Ayurveda, the working functionalities of the Saman Vata, are mentioned as Annam Grahani, Annam Pachati, Annam Vivechayati and Annam Munchati. These functions are well mirrored with the sequential activities started after intake of food by human body, mentioning the complete process of digestion in the GIT right from mouth to excretion out of body as a well-designed system. The physiological correlation of the individual activity of Saman Vata in similarity with the six steps of Digestion according to system of modern medicine as:

Deglutition and Retention of Food (Annama Grahani)

It accounts for receiving and withholding of ingested food in GIT. Basically, the Grahani of Anna is the activity of Prana Vata and Saman Vata conjugates with Prana Vata in receiving or Grahani of ingested food. In modern science, Deglutition is an extensive mechanism and comprises of three stages as:

1. **Stage of Mouth swallowing:** It is detailed as the voluntary stage committed by person advertently. After swallowing, it exerts upward and backward pressure against the palate inside mouth, which squeezes the ingested food posteriorly towards pharynx and 12th cranial nerve (hypoglossal nerve), is the nerve supply to the muscles of tongue.
2. **Stage of Pharyngeal swallowing:** It is detailed as the Involuntary stage committed by the pharynx inadvertently. After ingestion of food, the mandibular muscles squeeze the ingested food to make bolus form in the posterior part of mouth. This muscular action stimulates the epithelia of the swallowing receptor all around the pharynx. The sensory signals of trigeminal and glossopharyngeal nerve fibres, are transmitted into medulla oblongata. On the other hand, 5th, 9th, 10th, 12th cranial nerves transmit the motor impulses from the swallowing center by the muscle fibres of pharynx and oesophagus.
3. **Stage of Oesophageal swallowing:** It is detailed as an Involuntary stage committed by oesophagus itself inadvertently. It primarily pushes or transfers the food bolus from the pharynx to stomach downwards. It executes two types of basic peristaltic movement i.e., propulsive movements and mixing movements. These peristaltic movements work synergistically in a rhythmic wave pattern. These movements are initiated and controlled by the intrinsic nerve fibres of the Myenteric Nervous system ^[16].

Digestion of Food (Annam Pachati)

The digestion and metabolism of food, is basically the function of Agni and the procedure adopted, is referred as "Anna Pachana". But, the physiological role of Saman Vata is to maintain the balance of Agni, so that it may complete the process of optimum digestion and metabolism. Therefore, all the components involved in the stimulation and initiation of process of digestion and metabolism, are known for the activity of Saman Vata as "Annam Pachati". Similarly, the harmony among the Enteric Nervous System (ENS) and Central nervous system (CNS) across the sympathetic and parasympathetic nerve fibres of Autonomic Nervous system (ANS), maintains the bowel movements of the GIT.

Separation and Absorption of Food (Annam Vivechayati)

This process of digestion happens across the length of intestine, which details the separation of essence or the "Sara bhag" for assimilation and excretory waste or the "Kitta bhag" from the digested food and the procedure of its separation is known as "Anna Vivechana". The essential micronutrients and minerals with water, are radially absorbed across lumen of intestine, while excretory products like faeces and urine are pushed out of the body. The

bowel movements across the intestinal muscle contractions, occurs across the lumen of the intestine, followed by the contractions of centralized muscle segment to push chyme forward and backward in a rhythmic pattern. This pattern of systemic intestinal churning process exists until all the essential micronutrients remains in intestine for assimilation. All these activities are centrally maintained by the ENS, since it acts as Second brain in GIT and has ability to act independent of central nervous system (CNS).

The bowel movements are greatly impacted by the disturbance across neural system, which results into fermentation of gases due to waste accumulation in Rectum and Anus. This can also result into the absorption of Ama (undigested metabolites or toxins), which can initiate the systemic and local neural response disturbances across the lumen of Gut. In modern medicine, the concepts of Ayurveda of "Purisha" formation can be mirrored with the process of excretory waste accumulation across intestine, where digested food consisting of essential micronutrients like vitamins and minerals, are readily absorbed across the lumen of GIT. In large intestine, the water is freely absorbed to consolidate the digested food into solid waste faeces with absorption of additional salt and water, which finally converted into "Purisha" for excretion through Anus. The consistency of waste excretory matter is largely depended on the amount of the water absorption and is greatly influenced by intestinal motility and consumption of diet and water.

Expulsion of Waste (Annam Munchati)

According to Charaka, the expulsion of waste out of body across "Pakwashaya" (Anus), is majorly performed by Saman Vata in conjugation with Apana Vata activity. Basically, Saman Vata collaborates with the Apana Vata to expel the waste out of body, in the form of urge of faeces and urine. When the stomach expands fully after eating of food, it stimulates the nervous signal, initiating the contraction of muscles across rectum and results in urge to defecate or urinate the waste matter out of body. This stimulus is called as the gastrocolic reflex, which is stimulated by action of gastrin in the part of colon. Saman Vata stimulates the ENS, in managing the gastrointestinal reflex pathways, which manage the gastrointestinal secretion, bowel movements and muscle contractions across lumen of Gut. This stimulus consists of reflexes across the lumen of Gut, starting from the Gut to the sympathetic ganglia, reverse reflexes like the gastrocolic, enterogastric, colonoileal reflexes etc. and from the gut to the spinal cord or brain stem, effecting gastric motor activity, secretion and the defecation reflex. The lumen of Gut across its entire length, maintain the absorption of micronutrients dissolved in water of digested portion and forward propulsion of other solid substances from waste faeces. The rate of bowel movement starting from the caecum to the transverse colon across the lumen of large intestine happens at very slow speed, since it allows ample time needed for required water absorption, converting the digested food portion into a sludgy paste.

The Parasympathetic enteric nervous system initiates the defecation, stimulating the sigmoid, colon, rectum, and anus of GIT. Saman Vata bears its effective working area only within the Koshtha (GIT), regulating digestion and the absorption of body fluids (Sara Kitta Vivechana). The excretion of waste faecal matters out of Anus, is mainly governed by Apana Vata but in coordination with Saman Vata. When excretory waste reaches the rectum, distension of the muscle fibres of rectal wall stimulates the neural reflexes across the myenteric plexus (Saman Vata), initiating the peristaltic movements in the descending colon, sigmoid, and rectum to propel excretory waste toward the anus. After initiation of the bowel movements pattern, the internal anal sphincter relaxes due to inhibitory signals from the myenteric plexus, with the voluntary relaxation of the external anal sphincter (Apana Vata) simultaneously, helps to facilitate the comfortable process of defecation ^[17]. Since the intrinsic myenteric defecation reflexes are comparatively weak, so a strong parasympathetic reflex originating from the sacral spinal cord segment facilitate the efficient defecation. The Nerve response from the ENS (Saman Vata), sympathetic and parasympathetic nerve fibres from CNS (Prana Vata) in collaboration with ANS (Vyana Vata), collectively stimulate the gastrointestinal glands and its smooth muscle, resulting in initiation of the secretion and motility across the entire GIT.

Defecation:^[18]

After assimilation of essence, the excretory waste products propelled inside the colon, it pushes the faecal waste towards the rectum, which results in initiation of an urge to defecate the faeces out of Anus, is termed as Defecation. This urge of defecation or rectal distension, is initiated by a two-fold reflex response as:

- a) **Intrinsic Reflex:** These reflexes are originated by the myenteric plexus of ENS, where the sensory nerve signals are initiated by the distended rectal wall signaling to start the bowel movements starting from the descending colon, sigmoid colon and finally to rectum. These movements actually force the excretory waste towards the

rectum by the help of smooth relaxation of the internal anal sphincter.

- b) **Parasympathetic Reflex:** After filling of rectum with the excretory waste, it initiates the parasympathetic nerve supply, which send the neural reflexes towards the sacral spinal cord via pelvic nerve. In response of same, the spinal cord sends a back signal towards the descending colon, sigmoid colon and rectum pelvic parasympathetic nerve fibers. This stimulation of parasympathetic nerve reflex initiates the bowel movements by relaxing the internal anal sphincter, facilitating the process of defecation by contracting the pelvic muscles and the external anal sphincter remains opened or relaxed voluntarily.

Micturition:

The process of emptying the urinary bladder with the help of contraction of the muscle fibres of urinary bladder, initiating a stretch reflex, is termed as Micturition. After complete filling of the urinary bladder with urine, the stretch nerve receptors across the wall of urinary bladder activates by conveying the sensory nerve signals to the sacral segment of the spinal cord through pelvic nerve. In response to said reflex, the spinal cord responds by passing the reflexes signals back towards the urinary bladder across its parasympathetic nerve supply, which actually initiates the contraction of urinary bladder muscle (detrusor muscle) and simultaneous relaxation of the internal urethral sphincter, resulting in micturition.

Gastrointestinal Tract (GIT)

The Gastrointestinal Tract (GIT) is well managed by the Enteric Nervous System (ENS) in collaboration with the central nervous system (CNS) and Autonomic nervous system (ANS). The GIT comprising of a dense web or a neural bed of sensory neurons, motor neurons, and interneurons embedded deep across the wall of Gut across its lumen which basically stimulates the GIT starting from the bottom third of the oesophagus till the rectum. The neural supply to the oesophagus, stomach, liver, gall bladder, pancreas, entire small intestine and proximal half of the colon, is supplied by the cranial parasympathetic nerve fibers. The neural supply to the descending colon, rectum, urinary bladder, is supplied by the sacral parasympathetic fibers. In GIT, the stimulation of parasympathetic nerves increases the motility and tone of muscle fibers, relaxation of sphincters and increased secretions of digestive enzymes from the stomach, while the Sympathetic nerves decrease the motility and tone of muscles, contraction of sphincters and inhibited the secretion of digestive enzymes from the stomach ^[19].

The myenteric and submucosal plexus, carries the post ganglionic neurons of gastrointestinal parasympathetic system. In GIT, the parasympathetic postganglionic neurons which remain embedded majorly in the myenteric and submucosal plexuses, is the actual cause of increased activities across ENS ^[20]. The activity of ENS, is greatly controlled through these nerve fibers. The neural branches of sympathetic fibers of GIT, are initiating from the spinal cord between T7 T-11 segment. Majority of the preganglionic fibers remains out of the spinal cord before entering the sympathetic fibers chain. While, very few preganglionic nerve fibers enter with spinal cord origin without synapsing through the sympathetic fibers chain to merge with pre vertebral ganglia such as celiac ganglia and mesenteric ganglia and intermingles into postganglionic nerves supply across the lumen of Gut. The activity of GIT is managed majorly by the sympathetic nerve fibers due to the direct impact of secreted norepinephrine, which inhibits either the smooth muscle fibres of GIT or the nerve fibers supply of ENS ^[21].

Result:

The discussion of present research explored about the integrative understanding between physiology activity of Saman Vata with Grahni to detail its correlation with Gastrointestinal Tract (GIT). In reference of proper assimilation across GIT, digestion and micronutrient absorption, the important activity of Saman Vata, is to maintain the balanced condition of Agni. After extensively compiling and reviewing, the literatures of Ayurveda and modern science, textbooks, research journals, it is concluded that Saman Vata remains in closely to Agni, at the functional site of Grahani to manage the movements and neural transmission of entire digestive system through ENS. In collaboration with ENS, it controls the processes like ingestion, digestion, separation and excretion of waste products, demonstrating its actions like Grahana, Pachana, Vivechana and Munchana during digestion. The vitiated or disturbed condition of Saman Vata, results in Agni imbalance, which causes greater disturbances in secretory activity of digestive Juices. So, keeping the Saman Vata and Agni in their Normal or Balanced condition, is the necessity for the physiological functioning of Grahni. Further, the actual mechanism of digestion and nerve conduction in GIT

required for metabolism behind the physiological functioning of Saman Vata and Grahani, is maintained through ENS. The horizon of understanding the Digestion and GIT may be possible with further innovation and metamorphosis in research field, opening a specified area for further designated research strategies with better apprehension of metabolism. In broad aspect, the present study supersedes to establish how Ayurveda deals the digestion with a contemporary holistic approach and pays more attention towards the important aspect of comprehending the contribution of Saman Vata and Grahani in the field of Gastrointestinal disease.

Discussion:

The information detailed in classical Ayurvedic text books and other research papers about Saman Vata and Agni with its physiological activities to the control the Grahani (small intestine) and entire Gastrointestinal Tract (GIT) in collaboration with enteric nervous system (ENS), flourishes a border aspect in concern with the digestion and metabolism. The balanced condition of Agni results in good digestion and better assimilation of nutritional essence with proper excretion of the waste products out of body. The abnormal or vitiated condition Agni may result accumulation of Ama (undigested metabolites or toxins) and further to indigestion of food, which finally results in the pathology or disease condition and may leads to Gastrointestinal Disease, if not treated in time. Among all types of Vata Dosha, Saman Vata, is very significant in maintaining the optimum food digestion and assimilation, which is located in the naval region near Grahani and held responsible for the preservation of the Balanced condition of Agni. According to Ayurveda, all type of food digestion occurs in the Grahani (small intestine) and it is treated as the principal site of Saman vata and Agni functioning. The functions of Saman Vata and Agni bears close resemblance in their pattern of working, since the Saman Vata regulates the intake, digestion, separation and excretion of food products, along with the neural conduction required for metabolism through ENS. The complex relationship among Saman Vata, Agni and Grahani is elaborately mentioned in the classical Ayurvedic text books and relevant references. The principal activity site of Saman Vata and Grahni is the Kosta or Gastrointestinal Tract (GIT) Which is also narrated as the functional site of Agni (digestive fire). Saman vata is very necessary component for bowel movements and proper nutrient absorption during the process of digestion. In its balanced condition, it propels the food to pass through the process of catabolism, ensuring further conversion of food particles into minute absorbable components so that they can be assimilated across the lumen of Gut to be distributed throughout the body in maintaining the strength and nutrition to the body.

The main source of neural transmission in GIT, is the neural conduction between the ENS and CNS through its sympathetic and parasympathetic nerve fibres and ANS. Although the ENS is considered as the second brain of GIT, since it can function independent of CNS. In Ayurveda, the physiology of Saman Vata shows its similarity with the neural conduction of the ENS in GIT, in terms of gastric secretion, motility, absorption and excretion. Therefore, the physiological similarity may be concluded among Saman Vata in special reference to Grahani and GIT. Much More exploration is needed and more research studies are required in the said area to reveal the methods through which Saman Vata and Grahani, may be insighted with GIT and ENS to understand the proper physiology activity of digestion and metabolism, which may further clear the path for much-specialized treatment management in the field of Gastrointestinal Disorders. In general, Ayurveda is a very vast area and so expanded that it cannot be confined or defined under one single arm of research. In this research work, an attempt has been made to confine the physiological correlation between these important factors of digestion and metabolism which are interlinked with each other to perform the effective digestion and metabolism with proper understanding at the level of neural transmission across the lumen of Gut and also opens further scope researches, needed in this unexplored area in greater years.

References:

1. Shastri A.D. eds, Doshadhaatumala kshyayavridhhi vigyaaniyaadhyaya, Ayurveda Tatwa Sandipika Hindi Commentary, Sushruta Samhita, Varanasi (India): Chaukhamba Sanskrit Sansthan; Edition 2010. page no- 84.
2. Murthy K.R. Srikantha Murthy, English translation on Sushruta samhitha, Sutrasthana, Ch. 21, Ver. 8, Edition 2010, pg. 154
3. Shastri Pt. Kashinath, Editor Charaka Samhita of Vidyotini Hindi Commentary, Sutra Sthan, Ch. 12 Ver. 8, Vol. 1, Varanasi Chaukhambha Bharti Academy, Edition 2006, pg. 162.

4. Prof. K.R. Srikant Murthy, Angavibhaga Sharira Adhyaya, Astanga Sangraha, Sharirsthana 5/36, Vol. II, Chaukhambha Orientalia, Varanasi. Edition, Reprint; 2018. p. 64.
5. Dr. Srikant kumar panda, Basic Principles of Kriya Sharir, Chaukhambha Publishers, Varanasi, Reprint ed. 2021, 6, pp 106 – 108.
6. Dr. Subhash Ranade, Dr. R. R. Deshpande, Dr. Swati Chobhe A Textbook of Kriya Sharira, Chaukhambha Sanskrit Pratishthan, Delhi, Reprint ed. 2023, 13, pp 186-188.
7. Dr. Srikant Kumar Panda, Basic Principles of Kriya Sharir, Chaukhambha Publishers, Varanasi, ed. 2021, 6, pp 109.
8. Mishra Brahma Shankar, Editor Bhavprakash of Hindi Commentary, Purva Khand, Garbhprakaran, Vol. 1, Ch. 3, Ver. 109, Varanasi, Chaukhambha Sanskrit Sansthan, Edition 10th, pg. 36.
9. Tripathi Brahmanand, Editor Ashtang Hridayam of Vagbhatta Nirmala Hindi Commentary, Sutra Sthan, Ch. 12 Ver. 8, Delhi, Chaukhambha Sanskrit Pratisthan, Edition Reprint 2003, pg. 171.
10. Sharma R. K., Das Bhagwan, Editor Charaka Samhita of Chakrapani Dutta Ayurveda Dipika, Chikitsa Sthan, Ch. 15 ver. 51, Varanasi, Chaukhambha Sanskrit Series Office, Edition 2018, pg. 27.
11. Tripathi Ravidutta, Editor Asthang Sangraha of Vaagbhatta Saroj Hindi Commentary, Sutra Sthan, Ch.20 Ver. 4, Delhi, Chaukhambha Sanskrit Pratisthan, Edition, 1999, pg. 375.
12. Tripathi Brahmananda, Editor Ashtanga Hridaya of Vagbhhatta, Sutra Sthana, Ch.12 Ver. 8, Delhi, Chaukhmbha Sanskrit Pratisthan, Edition Reprint 2003, pg. 171.
13. Kaviraj Dr. Ambikadatta Shastri, Atisara Pratishedam Adhyaya, Sushrut Samhita, Uttartantra, Vol. II, Chaukhambha Sanskrit Sansthan, Varanasi. Edition: Reprint; 2019.p. 306.
14. Prof. K. R. Srikantha Murthy, Doshabhediya Adhyaya, Astanga Samgraha, Sutrasthana 20/1, Vol.I, Chaukhambha Orientalia, Varanasi. Edition, Reprint; 2018. p. 367.
15. Prof. Dr. Subhash Ranade, Prof. Dr. R. R. Deshpande, Prof. Dr. Swati Chobhe, Aharapaka, A Textbook of Kriya Sharira, Part-1; Chaukhamba Sanskrit Pratishthan, Delhi. Edition, Reprint; 2017. p.176.
16. Hall. E, Guyton. C. Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2006:782.
17. Hall. E, Guyton. C. Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2006:789.
18. Byrne PA, Gibbons CJ, Snyder CL, et al. Anorectal reflexes and their clinical significance. Dis Colon Rectum. -1467 doi:10.1007/s10350-008-9607-z [PubMed].
19. Prof. A.K. Jain, textbook of physiology volume 1, 2008:203.
20. Gabella G. The enteric nervous system and its extrinsic Connections. Philos Trans R Soc Lond B Biol Sci. 1995;349(1353):163-176. Doi:10.1098/rstb.1995.0118 [PubMed].
21. Hall. E, Guyton. C. Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2006:777.