



Review Article

HYPOTHETICAL ANALYSIS OF THE CONCEPT OF LANGHANA WITH RESPECT TO AUTOPHAGY

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ABSTRACT

Langhana is the treatment part of *Ayurveda* highly elaborated in its scientific approach. It is the form of *Apatarpana* generally opted for *Santarpanajanya Vyadhi*. Autophagy is relatively new and incidental finding of modern medicine which is currently researched on a very large scale for its anticipated outcomes in gerontology, autoimmune diseases as well as life style disorders. The results that are expected out of *Langhana* and the effects of autophagic mechanisms as presented today appear to be congruent although they are explained on different platforms with diverse terminology. Hence this is an attempt to put forth few complimentary aspects of both *Langhana* and autophagy which needs concrete scientific validation.

KEYWORDS: *Langhana, Apatarpana, Vyadhi, Autophagy.*

INTRODUCTION

Langhana is widely practiced as fasting in India. Fasting is done on many occasions as per Indian calendars to keep in track with the seasonal variations. The main purpose behind such traditions is to acclimatize body with the environmental changes. Some people avoid food and water completely; some prefer liquids whereas some consume stipulated foods and liquids. In *Ayurvedic* perspective however, fasting is one part of *Langhana*. Depending on the degree of altered metabolic responses in the body, different types of *Langhana* are suggested by *Ayurvedic* physicians^[1].

Autophagy is an evolutionarily conserved lysosomal catabolic process by which cells degrade and recycle intracellular endogenous (damaged organelles, misfolded or mutant proteins and macromolecules) and exogenous (viruses and bacteria) components to maintain cellular homeostasis^[2]. Autophagy is the natural, regulated mechanism of the cell that removes unnecessary or dysfunctional components. It allows the orderly degradation and recycling of cellular components^[3]. Several autophagy pathways operate within a cell including macroautophagy, microautophagy and chaperon-mediated autophagy^[4].

Need of *Langhana*

Ayurveda perceives the human body to be made up of *Dosha* (governing elements capable of jeopardizing bodily solidarity), *Dhatu* (body tissues which accommodate *Dosha* for metabolic activities) and *Mala* (wastes generated as a result of metabolic

activities)^[5]. These basic units together make the body and are associated with each-other through channels called *Srotasa*. These are so intricately and extensively interlaced that body is thought to be made up of *Srotasa*^[6].

In the view of the pathogenesis, the body is divided into three *Rogamarga* - *Abhyantara*, *Bahya* and *Madhyama*. *Abhyantara Rogamarga* generally includes the whole alimentary tract. *Bahya Rogamarga* contains *Tvak* (skin), *Raktadi* (circulatory tissues like blood) organs and *Madhyama Rogamarga* encloses organs like *Shira* (brain), *Hrudaya* (heart), *Basti* (urinary system), *Asthisandhi* (joints) etc.^[7]. *Dosha* are mainly seated into the *Abhyantara Rogamarga* i.e., *Amashaya*, *Pittashaya* and *Pakvashaya*. From here, they deliver moieties to other body parts for bodily functions^[8].

Unwholesome and unprincipled regimens disrupt the equilibrium of *Dosha* causing metabolic derangements^[9]. Depending on the degree of metabolic inconsistency and extent of virulence, three circumstances can arise - *Alpa Doshavastha*, in which vitiated *Dosha* are less significant and vitiation is comparatively minimal, *Madhya Doshavastha* where vitiated *Dosha* and vitiation is moderately higher and *Bahudoshavastha* where vitiated *Dosha* and vitiation are critically high. These vitiated *Dosha* cause effects on the body accordingly. The *Dosha* which are not dominant enough to cause metabolic irregularities, become dormant, saturate and after

getting sufficient access through *Kalabala* and *Mithya Ahara-Vihara*, lead to pathogenic changes.

These conditions can also be explained in terms of *Chaya- Prakopa* and *Prashama* or *Prasaradi* forms. *Chaya* is quantitative build up of *Dosha* in their respective places. These phases occur naturally due to seasonal variations (*Kalawsabhava*) or it can happen due to unethical routines. *Acharya* have directed to control vitiation of *Dosha* in *Chaya* phase only with different types of *Upakrama* of respective *Dosha*. In *Prakopa* phase, vitiated *Dosha* tend to progress to other places. *Prakopa* can occur due to detectable expansion of vitiated *Dosha* (*Chayapurvaka Prakopa*) or subjective augmentation of *Dosha* (*Achayapurvaka Prakopa*). *Achayapurvaka Prakopa* is generally caused due to intensification of some peculiar *Guna* like *Ushna*, *Sheeta* or *Guru* and their effect on the system. *Prakupita Dosha* gets eased down due to soothing effects of the following season or complaisant routine which is called as *Prashama* phase. Otherwise, *Prakupita Dosha* initiates pathogenic changes ultimately leading to disease causation through *Prasaradi Avastha*. *Langhana* is one of the scientific methods followed in *Ayurveda* to check the development of pathogenesis.

Concept of Langhana

Treatment part in *Ayurveda* is outlined as *Langhana* and *Brumhana*. *Langhana* is also called as *Apatarpana*. It is generally preferred in diseases which arise due to unscrupulous and overeating habits and sedentary lifestyles. It is sub-classified into *Shamana* and *Shodhana*^[10]. *Shamana* is of seven subtypes – *Pachanam* (medications which accomplish metabolic activities), *Deepanam* (medications which augment and strengthen the metabolic activities), *Kshut* (fasting), *Trut* (dehydration therapy), *Vyayama* (work outs), *Atapa* (light therapy) and *Vata sevana* (wind therapy). *Shamana* brings about equilibrium of the body mostly by chemically transforming potentially harmful metabolites through above described methods^[11].

Shodhana is removal of noxious elements from the body for preserving equilibrium. It is of five subtypes as *Niruha Basti* (enemata), *Vamana* (emesis), *Virechana* (purgation), *Shirovirechana* (nasal therapy) and *Raktamokshana* (bloodletting)^[12]. The type of *Shodhana* is adopted according to the presentation of vitiated *Dosha*. Usually, *Dosha* in gastric region, lower intestinal region, large intestinal area, head region and circulating and presenting on skin are treated with *Vamana*, *Virechana*, *Basti*, *Shirovirechana* and *Raktamokshana* respectively.

Concept of Autophagy

Autophagy is a quality control mechanism that destroys invading pathogens, such as bacteria

and viruses, detoxifies harmful materials and recycles large proteins into their individual building blocks, called amino acids. This lets the cell clear out harmful materials^[13]. In disease, autophagy has been seen as an adaptive response to stress, promoting survival of the cell; but in other cases it appears to promote cell death and morbidity. In the extreme case of starvation, the breakdown of cellular components promotes cellular survival by maintaining cellular energy levels.

Selection of method of Langhana

Langhana Chikitsa reinstates homeostasis by either regulating metabolic mechanisms (*Shamana*) or eliminating mechanisms (*Shodhana*). The gravity of vitiated *Dosha* and the type of *Rogamarga* involved, decides the relevance of type of *Langhana*. Factors like involved *Dhatu*, *Desha* (affected body part as well as patient's locality), *Bala* (physical and mental strength and immunity), *Kala* (season), *Anala* (digestive fire), *Prakruti* (body constitution of the patient) and *Vaya* (age of the patient) also need to be taken into account while selecting appropriate type of *Langhana* for the patient^[14].

Kshudha & *Trut* (starving), *Vyayama* (exercise), *Atapa* (sun bath) and *Vatasevana* are relatively mild forms of *Langhana Chikitsa* and are opted in *Alpa Doshavastha* as well as *Durbala Rugna*^[15]. Fasting (*Kshut*) has been vividly studied in modern medicine with encouraging results. Body enters the metabolic state called ketosis after twelve hours of fasting^[16]. In this state, body starts to break down and burn fat. Eighteen hours of fasting switches body to fat-burning mode and generates significant ketones^[17]. Within 24 hours, body cells increasingly recycle old components and break down misfolded proteins linked to Alzheimer's and other diseases^[18]. This is the one of the processes of autophagy. By 48 hours without calories or with very few calories, carbs or protein, growth hormone level is up to five times as high as when a person begins fast^[19]. By 54 hours, insulin is dropped to its lowest level point since beginning of fasting and body becomes increasingly insulin-sensitive^[20]. By 72 hours, body breaks down old immune cells and generates new ones^[21].

One in vivo animal study showed that exercise had induced autophagy in multiple organs involved in metabolic regulation, such as muscle, liver, pancreas and adipose tissue. The study also showed treadmill exercise induced autophagy in cerebral cortex of adult mice. So it was concluded that exercise may in part mediate the beneficial effects of exercise in neurodegeneration, adult neurogenesis and it was also seen to improve cognitive function^[22].

Deepana and *Pachana Chikitsa* are generally sought in *Madhyabala Doshavastha* with administration of various medicines which have *Deepana* (*Agnideepana* - drugs which stimulate metabolism) and *Pachana* (drugs which bring about metabolic changes) actions^[23]. *Ushna Jala* (warm water) is one such potent *Deepana* and *Pachana* drug which alters the metabolic pathways for the good^[24].

Bahudoshavastha is the condition to be treated with *Doshavasechana* i.e. removal of pathogenic Dasha from the body through various mechanisms. *Avipaka* (indigestion), *Aruchi* (disturbed perception of taste), *Sthaulya* (obesity), *Panduta* (pallor), *Gaurava* (heaviness of the body), *Klama* (unreasonable feeling of tiredness), *Pidaka-Kotha-Kandu* (skin eruptions with itch), *Arati* (world-weariness), *Alasya* (laziness), *Shrama* (exhaustion), *Daurabalya* (weakness), *Daugandhya* (body smell), *Avasada* (mental fatigue), *Kapha-Pitta Samutklesha* (bouts of cough and sour eructation), *Nidranasha-Atinidrata* (sleep disturbances), *Tandra* (drowsiness), *Klaibya* (impotency), *Abuddhitvam* (intellectual disorders), *Ashasta-Swapna Darshana* (irrational dreams), lethargy and loss of complexion in spite of consuming nutritious diet are some of the expressions of *Bahudoshavastha*^[25]. *Samshodhana* helps to remove obstructions in the flow of substances through *Srotasa*, normalizes systemic functions and thereby imparts optimal physical and mental health^[26].

In spite of huge set of benefits, *Ayurveda* warns to monitor effects of *Langhana* judiciously. Overuse of such therapies can lead to *Balakshaya* (loss of physical strength as well as immunity).

Ideal form of *Langhana* brings feeling of health and lightness and restores functions of systems. It is marked by smooth excretory functions like perspiration, bladder and bowel movements, feeling of lightness in *Hrudaya* (chest region), clean feeling of *Kantha* (throat region) and tongue, mental enthusiasm, appetite etc.^[27].

Overindulgence in *Langhana* restricts nourishment to the *Dhatu* and leads to *Parvabheda* (pain in DIP & PIP joints), *Angamarda* (bodyache), *Kasa* (coughing), *Mukhashosha* (dry mouth), *Kshut Pranash* (loss of appetite), *Aruchi* (disturbed perception of taste), *Trushna* (thirst), *Netra* and *Shrotra Daurbalya* (weakness of sensory organs like eyes and ears), *Manasambhrama* (mental confusion), *Urdhvavata* (gaseous troubles) and *Balanasha* (loss of strength and impaired immunity) etc^[28].

Mechanism of autophagy

Autophagy is described to be of three types namely macroautophagy, microautophagy and chaperon mediated autophagy. Macroautophagy is

extensively studied amongst these. Macroautophagy occurs at a low level constitutively and can be further induced under stress conditions, such as nutrient or energy starvation, to degrade cytoplasmic material into metabolites that can be used in biosynthetic processes or energy production, allowing for cell survival. Thus, macroautophagy is primarily a cytoprotective mechanism; however, excessive self-degradation can be deleterious. Microautophagy refers to a process by which cytoplasmic contents enter the lysosome through an invagination or deformation of the lysosomal membrane. Chaperon mediated autophagy is highly specific. CMA degrades a wide range of substrate proteins, including certain glycolytic enzymes, transcription factors and their inhibitors, calcium and lipid binding proteins, proteasome subunits, and proteins involved in vesicular trafficking^[29].

In addition to elimination of intracellular aggregates and damaged organelles, autophagy promotes cellular senescence and cell surface antigen presentation, protects against genome instability and prevents necrosis, giving it a key role in preventing diseases such as cancer, neurodegeneration, cardiomyopathy, diabetes, liver disease, autoimmune diseases and infections^[30].

DISCUSSION

Langhana has been widely followed as a part of treatment in *Ayurvedic practice*. It is considered so important that it is blended as part of Indian lifestyle since ages. Fasting is known to every household to revive bodily systems and is religiously practiced on many instances.

Depending on the presentation of pathological conditions, more and more vital options of *Langhana* are used by *Vaidya* in patients as a part of treatment.

The term autophagy was well admitted in the middle and later part of the 19th century. By the beginning of the 20th century it was assimilated into the core of the scientific knowledge of the time. The term was used to describe survival in periods of starvation on one's own resources^[31].

Christian de Duve coined the term autophagy in its present usage in 1963 based on his discovery of the functions of lysosome. Identification of autophagy-related genes in yeast in the 1990s led to study mechanisms of autophagy, which eventually fetched 2016 Nobel Prize in Physiology or Medicine to Japanese researcher Yoshinori Ohsumi. The incidental findings of autophagic activities have opened new doors to study the optimal responses generated in body for survival.

Various bioinformatics and network biology approaches have been developed by researchers in the last few years to understand the global organization of the autophagy system and its integration with other cellular processes. Recently, large-scale multi-omics approaches (like genomics, transcriptomics, proteomics, lipidomics, and metabolomics) have been developed and carried out specifically focusing on autophagy, and generating multi-scale data on the related components. [32]

Autophagy is usually a degradative pathway also participating in biosynthetic and secretory processes [33]. Hence it is correlated with *Langhana* in the present article. Autophagy is explained as an innate response of body whereas *Langhana* is a treatment offered by *Ayurveda*. Autophagy dysfunction has been observed during aging, and several genetic alterations in cancer, neurodegenerative and immune-related diseases have been associated to autophagy and autophagy genes [32].

So it is a million dollar question whether autophagy can be induced by any technique with the objective of stimulating survival mechanism or to achieve the effects of *Rasayana*.

Access to experimental autophagy in the present scenario appears to be equipped with nutritional status (fasting), eating particular types of foods that are supposed to enhance autophagy (through nutrient sensing hormones, kinases and phosphatases) and also to some extent exercising. It is induced with chemical agents in some experimental studies[34]. If it can be strategically designed, prevention and treatment of many diseases of poorly understood origin may be possible.

Langhana is an expression of *Ayurvedic* therapy in its technical and scientific way which incorporates fasting and exercising along with many more procedures to explore. It is interesting to note that *Bahudosha Lakshana* like *Avipaka*, *Kapha-Pitta Samutklesha*, *Sthaulya*, *Panduta*, *Kandu-Kotha-Pidaka*, *Alasya*, *Klama*, *Arati*, *Tandra*, *Nidravikara* etc are the manifestations in number of diseases from simple digestive to endocrinal, lifestyle as well as auto-immune pathologies.

Thus apparently both *Langhana* and autophagy mechanisms seem to be intended on the same objective of removing or degrading harmful substances which can potentially endanger the survival system.

Autophagy is integral to human health and is involved in physiology, development, lifespan and a wide range of diseases, including cancer, neurodegeneration and microbial infection³⁵.

CONCLUSION

Although *Langhana* and autophagy are explained on different grounds, their approach towards health appears to be quite resonating. Benefits of autophagy may be availed on a larger scale by practicing the scientific approach of *Langhana*.

Ayurveda provides more alternatives through *Langhana* to achieve health benefits alleged by autophagy means. *Langhana* techniques need to be thoroughly explored on cellular levels through joint approach of *Ayurveda* and modern medicine with its huge technological apparatus in order to study whether *Langhana* can be used to generate autophagic responses and to maximize its benefits.

REFERENCES

1. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the *Ayurveda Dipika* commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 121, C.Su.22/18
2. Antunes F, Erustes AG, Costa AJ, et al. Autophagy and intermittent fasting: the connection for cancer therapy?. *Clinics (Sao Paulo)*. 2018;73(suppl 1):e814s. Published 2018 Dec 10.
3. en.wikipedia.org>wiki>Autophagy
4. Autophagy - latest research and news, www.nature.com
5. Shrimat Vagbhatavirachitam Ashtanghrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar - Kaviraj Atridev Gupyta, editor - Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 85, A.H.Su.11/1
6. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the *Ayurveda Dipika* commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 249-250, C.Vi.5/3, 4
7. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the *Ayurveda Dipika* commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no.77, C.Su.11/48
8. Sushruta Samhita of Sushruta with the Nibandha sangraha commentary of Sri Dalhanacharya and the *Nyayachandrika Panjika* of Sri Gayadasacharya on Nidanasthana edited by Vd Jadavji Trikamji Acharya and the rest, Chaukhambha Orientalia, Varanasi, page no. 100, S.Su.21/6
9. Shrimat Vagbhatavirachitam Ashtanghrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar - Kaviraj Atridev Gupyta, editor

- Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 93, A.H.Su.12/34-43
10. Shrimat Vagbhatavirachitam Ashtangahrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar – Kaviraj Atridev Gupyta, editor – Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 101, A.H.Su.14/4
 11. Shrimat Vagbhatavirachitam Ashtangahrudayam, Vidyotini Bhasha Tika Vaktavya Parishishtasahitam, Tikakar – Kaviraj Atridev Gupyta, editor – Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 101, A.H.Su.14/6,7
 12. Shrimat Vagbhatavirachitam Ashtangahrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar – Kaviraj Atridev Gupyta, editor – Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 101, A.H.Su.14/5
 13. Nobel prize-winning autophagy research laid groundwork for potential Parkinson’s treatment, October 11, 2016 5.30am AEDT, The Conversation, Academic rigour, journalist flair
 14. Shrimat Vagbhatavirachitam Ashtangahrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar – Kaviraj Atridev Gupyta, editor – Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 95, A.H.Su.12/67, 68
 15. Shrimat Vagbhatavirachitam Ashtangahrudayam, Vidyotini Bhasha Tika Vaktavya Parishishta sahitam, Tikakar – Kaviraj Atridev Gupyta, editor – Vaidya Yaduunandan Upadhyay, Chaukhambha Prakashan, page 76, A.H.Su.8/21
 16. Anton, Stephen D et al. “Flipping the Metabolic Switch: Understanding and Applying the Health Benefits of Fasting.” Obesity (Silver Spring, Md.) vol. 26,2 (2018): 254-268.
 17. Autophagy: ‘What you need to know’, Healthline, Medically reviewed by Daniel Murrell, M.D. — Written by Sara Lindberg - Updated on August 23, 2018
 18. Mehrdad Alirezaei, Christopher C. Kembal, Claudia T. Flynn, Malcolm R. Wood, J. Lindsay Whitton & William B. Kiosses (2010) Short-term fasting induces profound neuronal autophagy, *Autophagy*, 6:6, 702-710,
 19. M L Hartman, J D Veldhuis, M L Johnson, M M Lee, K G Alberti, E Samojlik, M O Thorner, Augmented growth hormone (GH) secretory burst frequency and amplitude mediate enhanced GH secretion during a two-day fast in normal men, *The Journal of Clinical Endocrinology & Metabolism*, Volume 74, Issue 4, 1 April 1992, Pages 757-765,
 20. Progressive alterations in lipid and glucose metabolism during short-term fasting in young adult men S. Klein, Y. Sakurai, J. A. Romijn, and R. M. Carroll 01 NOV 1993
 21. Cheng CW, Adams GB, Perin L, et al. Prolonged fasting reduces IGF-1/PKA to promote hematopoietic-stem-cell-based regeneration and reverse immunosuppression [published correction appears in *Cell Stem Cell*. 2016 Feb 4;18(2):291-2]. *Cell Stem Cell*. 2014;14(6):810-823.
 22. He, Congcong et al. Exercise induces autophagy in peripheral tissues and in the brain. *Autophagy* vol. 8,10 (2012): 1548-51. doi:10.4161/auto.21327
 23. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 246, C.Vi.3/44
 24. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 246, C. Vi.3/40
 25. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 97, C.Su.16/13-15
 26. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 97, C.Su.16/17-19
 27. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 121, C.Su.22/34-35
 28. Charaka Samhita by Agnivesa, revised by Charaka and Dhridhabala with the Ayurveda Dipika commentary of Chakrapani Datta edited by Vd Jadavaji Triakamji Acharya, Chaukhambha Prakashana, page no. 121, C.Su.22/36-37
 29. Parzych KR, Klionsky DJ. An overview of autophagy: morphology, mechanism, and regulation. *Antioxid Redox Signal*. 2014; 20(3): 460-473.
 30. Glick D, Barth S, Macleod KF. Autophagy: cellular and molecular mechanisms. *J Pathol*. 2010; 221(1):3-12.
 31. Ktistakis NT. In praise of M. Anselmier who first used the term autophagie in 1859. *Autophagy*. 2017;13(12):2015-2017.

32. 'What We Learned From Big Data for Autophagy Research', Anne-Claire Jacomin, Lejla Gul, Padhmanand Sudhakar, Tamas Korcsmaros, and Ioannis P. Nezis, [www.ncbi.nlm.nih.gov > pmc > articles > PMC6107789](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6107789)
33. Autophagy wins the 2016 Nobel Prize in Physiology or Medicine in baker's Yeast fuel advances in biomedical research, Beth Levine and Daneil Klionsky, PNAS
34. Kinzler, M.N., Zielke, S., Kardo, S. et al. STF-62247 and pimoziide induce autophagy and autophagic cell death in mouse embryonic fibroblasts. Sci Rep 10, 687 (2020).
35. Yang Z, Klionsky DJ. Eaten alive: a history of macroautophagy. Nat Cell Biol. 2010;12(9):814-822.

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