

## An Appraisal on Concept of Ama with Special Reference to Xenobiotics

Vishnu C P<sup>1,\*</sup>, Anand S<sup>2</sup>, Anandu V<sup>3</sup>

### Abstract

Concept of ama is a unique entity in Ayurveda. The term ama denotes several meanings such as unprocessed food, partially digested food, the food which needs further transformation etc. It is the first stage of vranashotha and has main role in vyadhi utpatthi hence vyadhi also carries synonym as amaya. Impaired agni is the prime cause for ama utpatthi and it has the capacity to vitiate dosha, thereby disturbing the homeostasis of tridosha. As an important vyadhi ghataka, it is responsible for initiation of disease. Sama-nirama avastha influences on roga awastha and different vyadhi visesha. Rather than classical explanation, clinical understanding of ama will aid more utility in therapeutics phase. So, contemporary correlation is a requisite one here. Due to hypo-functioning of jataragni, ama is formed whereas further amalgamation of ama with dosha and dushya is defined as sama awastha. The term "xenobiotics" refers to substances that are not naturally occurring within an organism or are not typically part of its regular diet. Improper detoxification process results in accumulation of biological, bio-chemical, cytological wastes and inflammatory debris inside human body and it transforms into xenobiotics. Several research works have been done yet to define ill effect of xenobiotics inside human body and how it disturbs internal equilibrium of biological processes. Appraisal on interpretation of concept of ama and reactions occurring inside human body due to presence of xenobiotic compounds may help for a thorough utility of this in diagnostic as well as therapeutic aspects. Here an attempt is made for probable correlation of concept of ama with xenobiotics.

**Keywords:** Ama, xenobiotics, agni dushti, xenobiotic metabolism, food substance

### INTRODUCTION

Ama is described as substances within the body that remain undigested, partially digested, or incompletely metabolized, necessitating further processing. If these substances are not properly transformed and persist in the body, they can obstruct both the micro and macro channels, leading to the development of sroto vaigunya. According to Ayurveda, almost all diseases originate from the presence of ama dosha [1–2]. In vranashotha, there are three stages of vranashotha, ama awastha, pakwa awastha and pachyamana awastha, it reiterates the influence of ama in manifestation of any disease [3]. Agni dushti is the major component for ama utpatthi and ama can do further dushana over dosha and dhatu [4]. Jataragni, panchabhutagni and dhatwagni are main three agni's in the body. Jataragni is the agni present in mahakostha and it's function is to digest ingested food.

Jataragni is regarded as the primary digestive fire in the body, responsible for sustaining the functioning of all other digestive fires. The efficiency or balance of other digestive fires in the

#### \*Author for Correspondence

Vishnu C P  
E-mail: vishnucp05@gmail.com

<sup>1</sup>Assistant professor, Department of Roga nidana evam Vikriti Vigyana, Rajeev Institute of Ayurveda Medical Sciences & Research Centre, Hassan, Karnataka, India

<sup>2</sup>Assistant Professor, Department of Roga Nidana Evam Vikriti Vigyana, Global Institute of Ayurveda, Rajkot, Gujarat, India

<sup>3</sup>Assistant professor, Department of Roga Nidana Evam Vikriti Vigyana, Mandsaur Institute of Ayurved Education and Research, Mansour, Madhyapradesh, India

Received Date: October 20, 2023

Accepted Date: April 19, 2024

Published Date: May 07, 2024

**Citation:** Vishnu C P, Anand S, Anandu V. An Appraisal on concept of Ama with special reference to Xenobiotics. Research & Reviews: Journal of Herbal Science. 2024; 13(1): 7–10p.

---

body is directly influenced by the strength or equilibrium of Jataragni. Its primary role lies in the division of ingested food into essential nutrients (saara) and waste products (kitta).

When Jataragni's function is compromised, food isn't adequately digested, leading to the formation of ama. Even diseases triggered by external factors only arise when there's ama production and subsequent disturbance of the local agni in that area. Compounds which are exotic in nature to the normal cellular and biological environment of human body system denotes as xenobiotics [5]. The term "xenobiotic" originates from the Greek words "xenos," meaning "foreign," and "bios," meaning "life." Xenobiotics refer to substances that enter a biological system from outside sources and are not naturally produced by the body, nor did they exist prior to being artificially synthesized by humans. Additionally, substances present in higher concentrations than usual are also classified as xenobiotics [6].

### REVIEW LITERATURE

The word of ama indicates that undergone slight paka (digestion). The term "ama" encompasses the concepts of slight digestion, incomplete attainment of its final form, lack of complete digestion, partial cooking, and improper cooking [7]. Therefore, ama can be described as a substance engaged in the process of digestion without reaching its ultimate state. It's characterized by the incomplete formation of the initial bodily tissue, known as rasa, caused by a weakened digestive fire, or agni [8]. Undigested food, stemming from various factors of weak digestive fire, undergoes fermentation, known as "shuktatva," giving rise to a range of toxic conditions known as ama visha [9]. Some believe that when the vata and other doshas are compromised, they intertwine and create ama dosha, similar to how toxins form from spoiled kodrava. [10]. Agni dushti is the prime factor of ama utpatthi. Acharya Charaka mentions that due to weakness of jataragni, anna rasa is formed improperly and is called as ama [11]. Similarly, acharya Madhavakara tells that the essence which forms during transformation phase of digestion remains incomplete due to jataragni dourbalya and this turns into ama. Also he quotes that ama is the moola for all diseases [12]. Accumulation of mala, primary stage for vitiation of dosha are the other understandings pertained to ama [13]. It possess certain properties such as drava, guru, snigdha, picchila etc. and put in account for developing sarvadehika ama samanya lakshana. Xenobiotics refer to chemical or synthetic compounds present in a living organism, which the organism is unfamiliar with, as it typically neither produces nor consumes these compounds as part of its diet.

Xenobiotics also have distinct characteristics, such as high toxicity and a large molecular weight, which hinder their entry into microbial cells [14].

The undigested food essence (ahara rasa) in the stomach (amashaya) undergoes fermentation (shuktatva) after some time. This fermented state of the undigested food essence is referred to as ama [15]. Over time, the undigested food substance (ama) interacts with doshas and transforms into a pathogenic state, known as ama dosha. With prolonged stagnation, ama dosha further ferments, acquiring toxic qualities, resulting in a condition called ama-visha [16].

Increased fatigue, physical inactivity, functional disorders are the clinical presentations due to act of xenobiotics in human body [17]. Exposure with xenobiotics causes induced cell damage and can cause hereditary disorders also [18].

There is significant support for modifying specific genes in microorganisms to enhance the breakdown of xenobiotics, which has been found to yield highly accurate results [19]. Certain xenobiotic compounds undergo degradation through photochemical disintegration, which has been suggested as a significant method of degradation. Gut microbiota has main role in this regard for further biotransformation of disintegration of xenobiotics [20].

### DISCUSSION

The body removes xenobiotics by xenobiotic metabolism. This process involves the inactivation and removal of xenobiotics, primarily occurring in the liver. Excretion pathways include urine, feces, breath, and sweat. Xenobiotics are the chemicals which are extrinsic to the metabolism of an organism that

completely apart of the normal metabolism of it. If proper metabolism not present, xenobiotics will attain toxic qualities. Enzymes that aid in the metabolism of xenobiotics are classified into three phases: phase I, phase II, and transporter enzymes. Phase I enzymes metabolize lipophilic xenobiotics, rendering them more polar and creating sites for conjugation reactions. Phase II enzymes are conjugating enzymes that can directly interact with xenobiotics and frequently interact with metabolites generated by phase I enzymes. So, elimination of polar metabolites are through both passive and active transport. The dominant metabolic reactions in an individual are often determined by the interplay between chemical concentrations, enzyme affinity, and enzyme quantity. Due to their hydrophobic and chemically inert nature, the majority of xenobiotic compounds can easily penetrate the human body through biological membranes via diffusion. Moreover, these compounds pose challenges for elimination in their unchanged state via urine and bile, leading to their accumulation in hydrophobic cellular compartments, including the phospholipid bilayer of membranes, where they can disrupt normal cellular processes. Detoxification enzymes convert these substances into intermediates, which are often highly reactive and electrophilic, such as epoxides, free radicals, and carbonium ions. Subsequently, these intermediates undergo partial inactivation and increased water solubility through hydration or conjugation with glutathione.

Thus, xenobiotics are transformed into forms that can be easily excreted. However, inadequately inactivated intermediates can quickly bind to nucleophilic groups within the cell, including those on DNA, RNA, and proteins. While cellular defense mechanisms often prevent significant harm from such binding, it can lead to toxic or genotoxic effects in certain instances. A study investigated xenobiotic metabolism in circulating mononuclear leukocytes from human subjects. The study measured the presence of specific detoxification enzymes in these cells. Specifically, the activity of glutathione transferase in circulating human lymphocytes was observed and predicted to indicate an individual's susceptibility to toxic or genotoxic damage following exposure to certain xenobiotics.

In recent times, the increase in food contaminants and hazardous substances in the environment poses a significant threat to human health. Presently, various types of xenobiotics have been identified, including pesticides, preservatives, plasticizers, personal care products, dyes and pigments, medications, flavorings, fragrances, industrial chemicals, and environmental pollutants. Xenobiotics have the potential to change the composition of gut microbes, forming a subgroup known as "microbiota disrupting chemicals" (MDCs). These MDCs can induce alterations in the microbiota that are linked to intestinal, hormonal, and chronic or long-term systemic diseases in the host. Additionally, xenobiotics might modify the composition of the microbiota, resulting in dysbiosis, which is associated with various diseases and negative health effects, including increased toxicity of certain xenobiotics. Gut microbiome is negatively affected by adverse reactions occurred in between microbiome cloud and xenobiotics. Pathophysiologic impact of xenobiotics will trigger microbial composition disequilibrium. In fact, gut microbiota degrades or does bio-transforming the carcinogenic and genotoxic substances. The gut microbiota can convert xenobiotics into less toxic and mutagenic compound.

## CONCLUSION

Agni dushti leads to ajeerna and thereby manifestation of ama. It has pivotal role in vyadhi utpatthi. Xenobiotics are chemical or synthetic compounds discovered within a living organism, which are unfamiliar to the organism because they are not typically produced or consumed as part of its natural diet. So the substance like xenobiotics also have a negative impact in the individual health. Along with the free radical theory, the xenobiotics also can be considered as a potent cause in disease making. Distinguishing sama and nirama awastha propounds fruitful delineation of vyadhi in diagnostic and prognostic level. Concept of xenobiotics as modern interpretation may inculcate clinical utility of ama in therapeutic field.

## REFERENCES

1. Prof. Priyavrat Sharma; Charaka Samhita Vol 1 (SharirSthan Chapter 6/14); Varanasi; Chaukhambha Orientalia; 2005; Page No. 449.

2. Dr. Brahmanand Tripathi, Madhava nidana of Madhavakara with the commentary Madhukosha by Vijayaraksita & Srikanthadatta, Chaukhambha Surbharati Prakashan, Varanasi, 25/01 (Madhukosha Commentary); 2014. Page No. 465.
3. Amarkosha, Shri. Pandit Hargovinda Shastri, Chaukhambha Sanskrit Series, Seventh Edi.2005, II kand, IV Varga, Verse no 16, Page No. 519.
4. Prof. Priyavrat Sharma; Charaka Samhita Vol 1 (Sharira Sthana Chapter 6/14); Varanasi; Chaukhambha Orientalia; 2005; Page No. 449.
5. Vagbhata, Astanga Hridaya of Vagbhata with the commentaries Sarvangasundara of Arunadatta, Ed. Pt. Hari Sadasiva Sastri Paradakara, Chaukhambha Sanskrit Sansthan, Varanasi, (Reprint), Sutra sthana. 13/25; 2022. Page No. 216.
6. Patel, D., and DhruboJyoti Sen. "Xenobiotics: An essential precursor for living system." Am J Adv Drug Deliv 1 (2013): Page No. 262-270.
7. Prof. Priyavrat Sharma; Charaka Samhita Vol 2 (Chikitsa Sthana Chapter 15/44-49); Varanasi; Chaukhambha Orientalia; 2005; Page No. 253.
8. Prof. Priyavrat Sharma; Charaka Samhita Vol 2 (Chikitsa Sthana Chapter 15/44-49); Varanasi; Chaukhambha Orientalia; 2005; Page No. 253.
9. Dr. BulusuSitaram; Astanga Hridaya, Varanasi, Chaukhambha Orientalia. 2008 (Sutra sthana Chapter 13/25) Page No. 176.
10. Vagbhata, Astanga Hridaya of Vagbhata with the commentaries Sarvangasundara of Arunadatta, Ed. Pt. Hari Sadasiva Sastri Paradakara, Chaukhambha Sanskrit Sansthan, Varanasi, (Reprint), Sutra sthana. 13/26; 2022. Page No. 216.
11. Agnivesa, Charaka Samhita with Ayurveda Dipika Commentary, Ed. Acharya Y.T, Chaukhambha Orientalia, Varanasi, (Reprint), Chikitsa sthana. 15/44; 2015. Page No. 517.
12. Dr. Brahmanand Tripathi, Madhava nidana of Madhavakara with the commentary Madhukosha by Vijayaraksita & Srikanthadatta, Chaukhambha Surbharati Prakashan, Varanasi, 25/01 (Madhukosha Commentary); 2014. Page No. 465.
13. Dr. Brahmanand Tripathi, Madhava nidana of Madhavakara with the commentary Madhukosha by Vijayaraksita & Srikanthadatta, Chaukhambha Surbharati Prakashan, Varanasi, 25/01 (Madhukosha Commentary); 2014. Page No. 465.
14. Patel, D., and DhruboJyoti Sen. "Xenobiotics: An essential precursor for living system." Am J Adv Drug Deliv 1 (2013): 262-270.
15. 18. Patel, D., and DhruboJyoti Sen. "Xenobiotics: An essential precursor for living system." Am J Adv Drug Deliv 1 (2013): 262-270.
16. Kucherenko SV, Ovcharenko AM, Pushenko SL. Xenobiotics: a threat to the health of living organisms. InE3S web of conferences 2021 (Vol. 285, p. 03006). EDP Sciences.
17. Patel, D., and Dhrubo Jyoti Sen. "Xenobiotics: An essential precursor for living system." Am J Adv Drug Deliv 1 (2013): 262-270.
18. Croom E. Metabolism of xenobiotics of human environments. Progress in molecular biology and translational science. 2012 Jan 1;112:31-88.
19. Lundgren B, DePierre JW. The metabolism of xenobiotics and its relationship to toxicity/genotoxicity: studies with human lymphocytes. Acta physiologica scandinavica. Supplementum. 1990 Jan 1;592:49-59.
20. Ortiz P, Torres-Sánchez A, López-Moreno A, Cerk K, Ruiz-Moreno Á, Monteoliva-Sánchez M, Ampatzoglou A, Aguilera M, Gruszecka-Kosowska A. Impact of cumulative environmental and dietary xenobiotics on human microbiota: Risk assessment for One Health. Journal of Xenobiotics. 2022 Mar 17;12(1):56-