



Original Researcher Article

Conceptual Insights into Agni and its Correlation with Modern Metabolic Science

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Abstracts: Introduction: Agni essentially represents a basic principle of Ayurveda, regulating the processes of metabolism, transformation, and digestion at both the cellular and gastrointestinal levels. As recorded in the ancient texts, Agni forms the basis of health and regulates all functions related to the feeding of tissues, absorption of nutrients, and maintenance of overall balance. Similarly, the science of today attributes metabolic balance to the orchestrated functioning of cellular, hormonal, digestive, and enzymatic mechanisms. The understanding of metabolic regulation can be fully acquired by adopting an integrative approach toward understanding Agni.

Methods: Traditional Ayurvedic texts like Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya were compiled together along with their authentic commentaries in this narrative review. Literature review as related to modern science was done using the internet and databases.

Results: Review of the classical Ayurvedic literature revealed the existence of thirteen forms of Agni that function at different levels in tissue metabolism and digestion. The functional states of Agni, such as Samagni, Mandagni, Tikshnagni, and Vishamagni, shared conceptual similarity with normal, hypo-, hyper-, and irregular metabolic patterns described by modern biological studies. Agni (Agnidushti) disturbances have conceptually been related to diabetes mellitus, obesity, dyspepsia, metabolic syndrome, and chronic inflammatory diseases. These findings confirm Agni as a broad metabolic paradigm that interlinks systemic, cellular, and gastrointestinal physiology.

Discussion and Conclusion: Throughout this review, Agni has been described as a holistic Ayurvedic concept that encompasses both GI digestion and cellular and biochemical metabolism. Its multidimensionality correlates well with contemporary metabolic pathways. Balanced Agni would thus

afford a broad view on the prevention of metabolic disorders and attainment of systemic homeostasis.

Keywords: Ayurveda, Agni, Metabolism, Jatharagni, Dhatvagni, Digestive fire.

INTRODUCTION

According to Ayurvedic classics like *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*, *Agni* [1] is the collective biological fire that is in charge of food digestion, absorption, assimilation, and the conversion of food into energy necessary for life. The gastrointestinal system (*Jatharagni*), elemental metabolism (*Bhutagni*), and tissue-specific transformations (*Dhatvagni*) are only a few of the hierarchical levels at which *Agni* is thought to operate. The transformation of consumed food into increasingly nuanced forms of energy and sustenance is represented by this multi-level structure. Longevity, vigour, immunity, and mental clarity are claimed to be supported by balanced *Agni*, while sickness, metabolic disorders, and the buildup of poisons (*Ama*) [2] are associated with defective *Agni*.

A thorough quantitative understanding of metabolism is provided by contemporary biomedical science. It includes chemical processes that produce ATP, maintain cellular respiration, break down food (catabolism), and synthesise biomolecules (anabolism) [3]. Enzymes, hormones, mitochondria, and regulatory mechanisms interact intricately during these activities.

A comprehensive, mechanistic view of digestion, energy production, and disease processes can be obtained by integrating *Agni's* ideas with contemporary metabolic science. To improve integrative healthcare research, this review seeks to establish conceptual linkages.

MATERIALS AND METHODS

This review adopts a narrative methodology based on:

➤ Classical Ayurvedic Sources

Primary texts examined include:

- *Charaka Samhita* (*Sutrasthana*, *Chikitsasthana*)
- *Sushruta Samhita* (*Sutrasthana*)
- *Ashtanga Hridaya*
- Commentaries such as *Ayurveda Dipika* and *Sarvanga Sundara*

These texts provided descriptions of *Agni*, its types, functions, and role in health and disease.

➤ Modern context sources:

Different books and articles, and internet.

TYPES OF AGNI AND THEIR FUNCTIONS [4]

Ayurveda conceptualizes *Agni* as the fundamental principle governing digestion, metabolism, and transformation in the body. Classical texts describe thirteen types of *Agni*, which collectively regulate the conversion of food into bodily tissues and energy. These are classified into *Jatharagni*, *Bhutagni* (five), and *Dhatvagni* (seven).

1. Jatharagni

Jatharagni[5] is the principal digestive fire and the foundation of all metabolic activities.

Location: Gastrointestinal tract (*Amashaya–Pakwashaya*)

Functions:

- Responsible for **gross digestion** of ingested food
- Initiates the **primary breakdown** of food into absorbable components
- Regulates appetite, digestion, absorption, and assimilation

Modern Correlation:

Jatharagni can be correlated with:

- Gastric acid secretion [6]
- Digestive enzymes (pepsin, amylase, lipase, trypsin, etc.)
- Gastrointestinal motility
- Functional activity of the gut microbiota

Proper functioning of *Jatharagni* is essential for the balanced activity of *Bhutagni* and *Dhatvagni*.

2. Bhutagni [7] (Five Elemental Fires)

After the action of *Jatharagni*, ***Bhutagni*** acts upon the digested food.

Types:

- *Parthiva Agni* (Earth)
- *Apya Agni* (Water)
- *Tejasa Agni* (Fire)

- *Vayavya Agni* (Air)
- *Akasha Agni* (Ether)

Functions:

- Converts digested nutrients into forms compatible with the body's **Panchamahabhuta composition**
- Ensures elemental homogeneity between food and body tissues

Modern Correlation:

Bhutagni activity corresponds to:

- Enzymatic modification of absorbed nutrients
- Biochemical transformations in the liver and systemic circulation [8]
- Conversion of nutrients into bioavailable molecular forms

3. Dhatvagni [9] (Seven Tissue-Level Fires)

Each Dhatu possesses its own **Dhatvagni**, responsible for tissue-specific metabolism.

Types and Associated Dhatus:

- *Rasagni* – *Rasa Dhatu*
- *Raktagni* – *Rakta Dhatu*
- *Mamsagni* – *Mamsa Dhatu*
- *Medagni* – *Meda Dhatu*
- *Asthyagni* – *Asthi Dhatu*
- *Majjagni* – *Majja Dhatu*
- *Shukragni* – *Shukra Dhatu*

Functions:

Ayurvedic State of Agni	Classical Description	Modern Physiological Correlation
<i>Samagni</i>	Balanced and stable digestive fire ensures proper digestion, absorption, and tissue nourishment	Normal metabolic function, optimal enzymatic activity, metabolic homeostasis
<i>Mandagni</i>	Diminished digestive capacity leading to incomplete digestion and <i>Ama</i> formation	Hypometabolism, dyspepsia, delayed gastric emptying, reduced enzyme secretion, hypothyroid-like metabolic state
<i>Tikshnagni</i>	Excessively strong digestion, causing rapid metabolism and tissue depletion	Hypermetabolism, hyperacidity, increased catabolism, and inflammatory metabolic states
<i>Vishmagni</i>	Irregular and unpredictable digestive activity due to <i>Vata</i> dominance	Dysbiosis, irritable bowel syndrome (IBS), fluctuating gut motility, metabolic instability

Agni is the driving force behind digestion, tissue nourishment, thermoregulation, immunity, mental clarity, and overall vitality. Classical texts state that when *Agni* is balanced, the individual

- Transformation and nourishment of respective tissues
- Formation of **Upadhatus** and **Malas**
- Maintenance of tissue integrity and physiological strength

Modern Correlation:

Dhatvagni can be correlated with:

- Cellular respiration
- Mitochondrial ATP production
- Protein synthesis [10]
- Lipid metabolism
- Haematopoiesis and tissue regeneration

Conceptual Integration

The harmonious functioning of *Jatharagni*, *Bhutagni*, and *Dhatvagni* ensures proper metabolism and health. Impairment at any level results in *Agnimandya*[11], leading to *Ama* formation, metabolic disorders, and systemic diseases, highlighting the central role of *Agni* in Ayurvedic pathophysiology.

STATES OF AGNI [12] AND THEIR MODERN PARALLELS

Ayurveda describes four functional states of **Agni**, which reflect the efficiency and stability of digestion and metabolism. These states determine health or disease and can be meaningfully correlated with modern metabolic concepts.

remains healthy; when *Agni* is impaired, diseases manifest.

AGNI AND MODERN ENERGY PATHWAYS

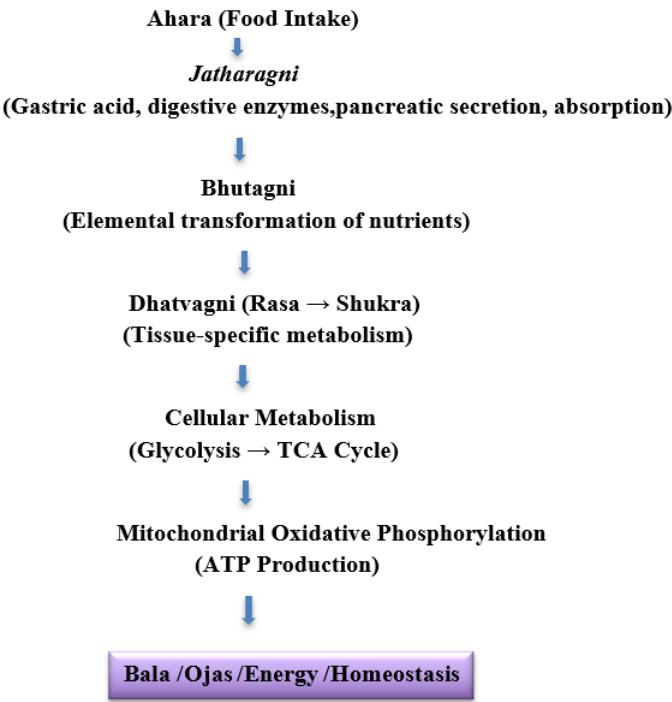
Jatharagni correlates with digestive enzymes, gastric acid secretion, pancreatic activity, and intestinal absorption. *Dhatvagni* aligns with cellular metabolism, mitochondrial ATP production, protein synthesis, glucose oxidation, and hormonal regulation. *Agni* encompasses both anabolic and catabolic biochemical reactions, similar to modern metabolism.

Correlation with Modern Energy Pathways

- Glycolysis and the Citric Acid (TCA) Cycle can be conceptually correlated with

Dhatvagni activity, as these pathways are central to intracellular energy extraction and tissue nourishment.

- Mitochondrial oxidative phosphorylation resembles the subtle, continuous metabolic “fire” described in Ayurveda as sustaining cellular vitality and bioenergetics.
- Hormonal regulation of metabolism, involving insulin, glucagon, and thyroid hormones, parallels the classical Ayurvedic concept of *Agni* regulation by *Doshas*, particularly *Pitta* and *Vata*.



Flowchart of agni with modern energy correlation

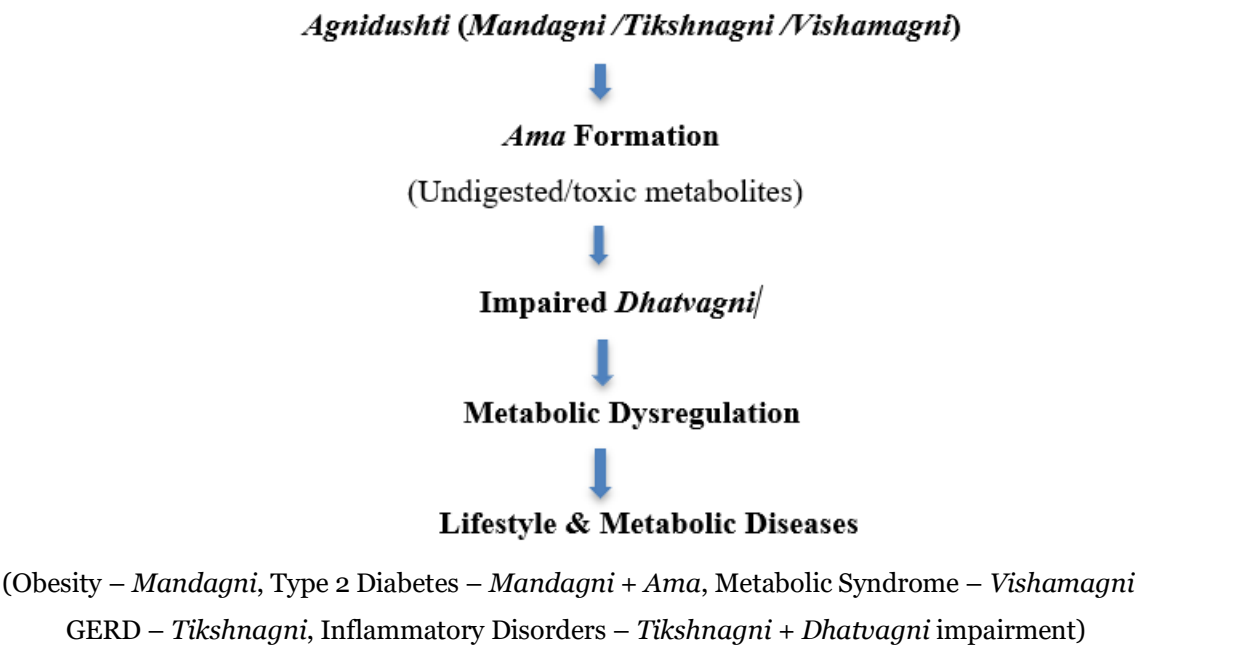
DISORDERS OF AGNI AND METABOLIC DISEASES:

Disturbances of *Agni* (*Agnidushti*) form the pathological basis of several metabolic and lifestyle disorders. These disturbances exhibit strong conceptual parallels with modern metabolic diseases.

Metabolic Disorder	Ayurvedic Agni Disturbance	Conceptual Pathophysiology
Obesity	<i>Mandagni</i>	Reduced metabolic efficiency leading to fat accumulation
Type 2 Diabetes Mellitus	<i>Mandagni</i> with <i>Ama</i>	Impaired digestion and metabolism with toxic metabolite accumulation
Metabolic Syndrome	<i>Vishamagni</i>	Irregular metabolic regulation and systemic instability
Hyperacidity / GERD	<i>Tikshnagni</i>	Excessive digestive and metabolic activity

Inflammatory Disorders	Tikshnagni with impaired Dhatvagni	Heightened catabolism with defective tissue metabolism
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Ayurveda’s *Agni* theory provides a comprehensive framework that integrates digestion, metabolism, cellular energy production, and hormonal regulation. The parallels with modern bioenergetics underscore *Agni* as a foundational principle in understanding metabolic health and disease.



CORRELATION OF AGNI WITH MODERN METABOLISM

S.NO.	Ayurvedic Concept of Agni	Modern Metabolic Correlation
1.	<i>Agni</i> is responsible for digestion (<i>Ahara Paka</i>) [13]	Mechanical digestion, gastric acid secretion, pancreatic and intestinal enzymes
2.	Jatharagni is the principal digestive fire	Central role of gastrointestinal digestion enabling nutrient availability
3.	Transformation of food into <i>Rasa Dhatu</i> [14]	Absorption of nutrients into blood and lymphatic circulation
4.	<i>Bhutagni</i> converts nutrients into elemental forms	Biochemical modification, enzymatic conversion, hepatic metabolism
5.	<i>Dhatvagni</i> nourishes individual tissues	Tissue-specific cellular metabolism and mitochondrial function
6.	Balanced <i>Agni</i> (<i>Samagni</i>) maintains health	Metabolic homeostasis and balanced anabolic–catabolic activity
7.	<i>Mandagni</i> leads to <i>Ama</i> formation	Incomplete digestion, metabolic waste accumulation, inflammation
8.	<i>Tikshnagni</i> causes excessive tissue breakdown	Hypermetabolism, increased catabolism, inflammatory metabolism
9.	<i>Vishamagni</i> causes irregular digestion	Functional GI disorders, IBS [15], metabolic instability

10.	<i>Agni</i> produces <i>Bala</i> , <i>Ojas</i> , and <i>Prana</i>	ATP production, immune competence, neuroendocrine balance
11.	<i>Agnidushti</i> is root of disease	Metabolic dysfunction underlying chronic diseases
12.	Maintenance of <i>Agni</i> ensures longevity	Efficient metabolism, reduced oxidative stress, healthy aging

DISCUSSION

Ayurveda used the multi-layered framework of *Agni*, which symbolises the body's total transformational potential, to reconstruct metabolism. *Agni* includes the physical, physiological, and psychological aspects of metabolic activity, indicating a comprehensive grasp of human physiology, in contrast to modern metabolism, which mainly concentrates on biochemical reactions at the cellular level. According to Ayurveda, metabolism is seen as an ongoing process that starts with digestion and continues through tissue feeding, energy production, and mental processes. This continuous metabolic continuity is demonstrated by the division of *Agni* into *Jatharagni*, *Bhutagni*, and *Dhatvagni*. *Bhutagni* facilitates biochemical and elemental transformation, *Dhatvagni* controls tissue-specific metabolism and cellular energy production, and *Jatharagni* controls gastrointestinal digestion and nutritional breakdown. This multi-layered approach connects systemic physiology, such as immunity, circulation, and vitality, with stomach digestion.

Agni is unique in that it correlates with contemporary ideas of the gut–brain axis and neuroendocrine regulation by being sensitive to psychological elements like stress, emotions, and lifestyle. *Ama*, which stands for partially metabolised chemicals and systemic dysfunction, is created when *Agni* is impaired. As a result, *Agni* offers a thorough and dynamic model of metabolism, providing an integrated viewpoint that promotes holistic and preventative healthcare practices and enhances contemporary biochemical approaches.

1. Conceptual Overlap

Agni provides a qualitative, systemic explanation for human metabolism, while biomedicine offers a quantitative and mechanistic description. Despite differing terminologies, both systems describe:

- Breakdown of food
- Absorption of Nutrition

- Cellular energy production
- Tissue-specific metabolism
- Elimination of Waste

This illustrates a profound conceptual convergence.

2. Integration for Modern Healthcare

2.1 Preventive Health

Ayurveda emphasises maintaining *Agni* through:

- Appropriate diet
- Lifestyle routines
- Seasonal adjustments
- Digestive fire–enhancing herbs (*Deepana-Pachana*)

These principles align with modern recommendations on gut health, metabolic balance, and lifestyle modification.

2.2 Understanding Metabolic Disorders

The Ayurvedic concept of *Ama*, a result of impaired *Agni*, can be compared to:

- Undigested metabolic residues
- Inflammatory molecules
- Oxidative stress
- Gut-derived toxins

This provides an expanded understanding of inflammatory and metabolic disorders.

2.3 Therapeutic Implications

Integrative approaches combining:

- Ayurvedic digestive therapies
- Modern nutritional science
- Microbiome-based interventions may provide innovative strategies for managing metabolic diseases.

CONCLUSION

According to Ayurveda, *Agni* has many aspects, an all-encompassing framework of metabolism. Its similarities to enzyme reactions, cellular energy production, gastrointestinal digestion, and biochemical transformations show a correlation with contemporary metabolic biology. Understanding *Agni* via both traditional and modern perspectives broadens our

understanding of human physiology and provides a comprehensive approach to treating metabolic diseases. Preventive medicine, individualised nutrition, and holistic healthcare may all benefit greatly from the integration of Ayurvedic *Agni* principles with contemporary metabolic science.

Limitations of the Study

- There are conceptual rather than literal parallels between Ayurveda and contemporary metabolism because they employ different epistemic frameworks.
- There is still little quantitative confirmation of *Agni* parameters in scientific studies.
- To validate physiological models based on Agni theory, more experimental research is needed.

Future Directions

- Research on the relationship between Ama and inflammatory biomarkers;
- Development of biomarkers that reflect various Agni states;
- Integrative therapeutic regimens that combine Ayurvedic and biological metabolic interventions;
- Clinical studies assessing Agni-balancing therapies

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