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CORRELATION OF JATHARAGNI WITH BASAL METABOLIC RATE IN HEALTHY ADULTS

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Abstract

Agni is always present in the paka process (digestive and transformative process). The digestion, absorption, and assimilation of the food taken into the body are an inevitable process essential to life support, known as Agni. The ayurvedic literature describes four types of Jatharagni balanced (Samagni), hyperactive (Tikhshnagni), hypoactive (Mandagni) and irregular (Vishbamagni). The metabolic efficiency differences among the stages are reflected in the changes in modern physiology. Samggni, harmonizes with the correct basal metabolic rate (BMR) and with the correct enzymatic activity, promoting efficient energy generation, proper nutrient use, and the maintenance of internal balance. Symptoms of Mandagni are like those of hypothyroidism or "metabolism slowing"-loss of energy, delayed digestion, weight gain or exhaustion. Like hyperthyroid states, ikshnagni, leads to hypermetabolism, causing heightened energy expenditure, quick digestion and sometimes weight loss. Ushamagni, is an indicator of metabolic imbalance and inexplicable fluctuations in appetite and energy. Some examples of modern-day correlations include neuroendocrine control of energy expenditure, thyroid hormones, gut bacteria, digestive enzymes, and gastric secretions. New integrative research suggests that investigating Jatharagni through clinical symptoms, including hunger, digestive quality, doshas, and pulse diagnosis, can provide predictive information on changes in basal metabolic rate (BMR) and metabolic health in humans. This study combines traditional Ayurvedic texts with contemporary physiological research to underscore



	potential integrative approaches for personalized nutrition, lifestyle management and preventive health care. Ashtanga Hridaya, Sushruta Samhita and Charaka Samhita are the texts concerned. There is a need for further clinical validation because there is no quantitative comparison data with healthy populations.
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1. INTRODUCTION

Three parts make up a person's daily energy expenditure (DEE) according to a popular model of human nutrition: thermic effect of food, thermic metabolic rate (BMR) extrapolated to 24 hours, which makes up around 25% of DEE, and thermic effect of physical activity, which makes up about 65% of DEE in sedentary subjects. Researchers looking into obesity and its treatments have often focused on BMR because of the substantial role it plays in DEE, especially in obese people [1]. Total cellular and tissue energy expenditure (EE) under resting, fasting, and thermo neutral a circumstance is conceptualized as basal metabolic rate (BMR) [2]. Organ and tissue size, as well as metabolism, regulate it. Several factors influence basal metabolic rate (BMR), including gender, age, level of physical activity, nutritional status, and body composition as measured by fat mass and fat-free mass. The main factors that determine basal metabolic rate (BMR) include gender, age, height, weight, and body composition. Gender has a significant role in basal metabolic rate (BMR), with males having a greater BMR than women after accounting for body composition [2]. Furthermore, beyond the age of 20, sedentary people's basal metabolic rate (BMR) declines by 1-2% per decade. Because of this decline in EE, it is anticipated that the capacity to regulate energy balance would deteriorate with advancing age. The literature is mixed on this question for normal individuals [3], although several studies have examined whether EE declines with age and whether females have lower EE than men. For 90% of people with body mass indexes (BMIs) between 18.5 and 45 kg/m², the Harris-Benedict formula and other online calculators accurately estimate basal metabolic rate (BMR) within 10% of the true value. Muscle accounts for 80-90% of energy expenditure during exercise, even though it contributes only 25% of resting metabolic rate (RMR). Adipose tissue contributes just a small amount to daily energy expenditure, with about 3 kcal/kg of body fat eaten daily. If a reliable technology is used to calculate BMR, it will always be far greater than the reported food intake [4].

Not only is *Agni* the fire element that breaks down food, but it is also the *Pakashakti* (transformative intellect) that controls our bodies' internal environments, including our awareness, our immune system, and the proper nutrient delivery to our tissues.

The first step to this is "*Agniḥ Sarvadehinām Āyuh*" (Cha. Chikitsa 15/4), a crucial element: its name. This metamorphic force governs metabolism, immunity and energy [5]. The immune system, hormone levels, digestion, and metabolism are controlled by internal, 24-hour cycles or rhythms. The ancient wisdom of Ayurveda is supported by modern science: the effects of light, meal timing, and sleep cycles on gut flora, glucose tolerance, and fat accumulation [6]. Unlike modern nutrition, which focuses on calories and macros, Ayurveda emphasizes being prepared, aware of the context, and ready for actual nutrition or nourishment. In Ayurveda, *Agni* is one of the essential elements in our digestion and metabolism. *Agni* helps in the digestion, absorption, and assimilation of food, which are essential for life-supporting processes.



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Ayurveda has a specific meaning for the word "Agni," which relates to the digestion of food and the metabolism of metabolic waste.

Agni is in charge of all the essential bodily processes; it does this by transforming food into energy. Thus, according to Ayurveda, *Dehagni* is the source of all the following: vitality, complexion, strength, health, sustenance, lustre, *oja*, *teja*, *prana*, and *energy*. This is stated in Cha. Chi. 15/3. [7]

When discussing the significance of *Agni*, *Acharya Charak* said that a person dies when Agni's function stops and that a person is perfectly healthy and enjoys a long, happy life when Agni is active. However, diseases and poor health may set in when a person's Agni is vitiated, which disrupts the body's metabolism. Thus, Agni is considered the very essence (*mool*) of existence. Chapter 15, Section 4, Line 8

According to contemporary medicine, all of our cells (*dhatu paramanu*) are constantly dividing and multiplying, undergoing metabolic processes. Every living thing's fundamental building block is the cell. The body's components, in *Charak's* view, would inevitably become infinitesimally small and ultrasensory if broken down even more into their component atoms. *Vata* and the action's nature (Cha. sha.7/17) are the activating elements in cell conjunction and disjunction [9]. The process of creating the "*Avayavaas*" from "various *dhatu*s" is detailed in *Shushrut* (Su.Sha.4/25-30) [10]. So, according to *Charak and Shushrut*, those cells up there are "*dhatu paramanus*." A biological energy is continuously necessary for these ubiquitous cellular operations; in the absence of this energy, our very existence is precarious. In Ayurveda, Agni provides the same kind of biological energy. There are two forms of the biological energy that Agni supplies to our cells (*dhatu paramanu*): kinetic and potential.

2. METHODS

The intent of this narrative review is to gain insight into the effect of the ayurvedic concept of Jatharagni on BMR in healthy humans. A comprehensive literature review was required to merge the traditional ayurvedic concepts with the up-to-date research on metabolism and energy expenditure.

Search Strategy The electronic databases, DHARA, AYUSH Research Portal, Scopus, Google Scholar and PubMed, were comprehensively searched. The original texts and commentaries of classical Ayurvedic books like Charaka Samhita, Sushruta Samhita and Ashtanga Hridaya were studied. The following keywords were used in the search as well, along with the MeSH terms: "Jatharagni", "Agni", "Samagni", "Tikshnagni", "Mandagni", "Vishamagni", "Resting Metabolic Rate", "RMR", "Digestive Physiology", "Ayurveda and Metabolism", "Ayurvedic concepts of digestion", and "Energy Expenditure".

Data Synthesis

A narrative synthesis method was used to include the results. Information from both ancient and contemporary scientific literature was categorised under classical concept of Jatharagni, physiological basis of BMR, potential relationship between Jatharagni and BMR and types of Jatharagni and its characteristics. The concepts of efficient digestion, thermogenesis and hormonal control and energy balance were emphasized. Since this is mostly an exploratory and conceptual research, no meta-analysis was carried out.



INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria This evaluation only includes articles and literary materials that meet certain requirements:

- Ayurvedic literature (Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya) explaining about Jatharagni and its different forms (Samagni, Vishamagni, Tikshnagni and Mandagni) with physiological significance.
- Original research or literature reviews on such topics as energy expenditure, metabolism, digestive physiology, and BMR.
- Metabolism, thermogenesis, or endocrine control are modern scientific concepts that can be compared to the Ayurvedic concept of Agni particularly Jatharagni in scholarly works.
- English Language Publications: Books, Peer reviewed journals, True Ayurveda comments.
- Classical Ayurvedic literatures published or not, are accepted and articles from 2000 to 2025 are included.

Exclusion Criteria Excluded from the review was the following categories of literature:

- Exclusion of research on Jatharagni and choosing research on other varieties of Agni (Bhutagni and Dhatvagni).
- Pieces that don't deal with the physiology of digestion or metabolic processes.
- Opinion papers, editorials, conference abstracts, and non-peer reviewed papers that do not refer to any important scientific or classical work.
- It is not suitable to study sick animals or humans without studying healthy adults.
- Articles in languages other than English have been analysed.
- Publications that are similar to each other; publications that provide insufficient methodological information; publications that contain outdated ideas that are not consistent with today's knowledge.

3. CLASSICAL UNDERSTANDING OF AGNI IN AYURVEDA

Agni encompasses more than just the digestive process. Metabolic processes are seen as multi-tiered and multi-level, including everything from the digestion of food to the modification of Dhatus (subtle bodily tissues) and Bhutas elements. In the transformation and absorption processes that sustain life, three distinct forms of Agni are mentioned in ancient texts [11].

A. Jathragni

The principle fire, *Jatharagni*, is responsible for governing and supporting all other types of Agni [5]. *Jatharagni* is responsible for the initial stages of food digestion and the breakdown of solids into liquid components, and it resides in the *Amasaya and Pakwasaya*, the digestive tracts [5]. The operation of this primary regulating factor influences the activity of all other kinds of Agni. *Doshas*, food quality, emotions, and time all affect *Jatharagni's* strength, which



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is then classified into *Samagni*, *Viṣamagni*, *Tikshṇagni*, and *Mandagni* [12]. Contemporary associations may include the cyclical fluctuations of gastrointestinal secretions regulated by the circadian system, gut motility, and enzyme activity.

What we call "*Jatharagni*" is really the bioenergy, or Agni, that resides in the duodenum and stomach. The seat is *grahani* (duodenum), so named because it retains food for a specific period within the *Amasaya* (stomach) to assist digestion, according to *Ashtanga Hridaya (Jatharagni)*. According to *Dhanvantari*, the Kala called "*Pittadhara*" seals off the food route and is located at the entrance of the *Pakvashaya* (intestine). It governs the *bhutagni* and *dhatvagni's* power, vitality, longevity, courage, ojas (the core of the *dhatu*s), and health. The power of Agni comes from the *grahani*, and the *grahani's* strength comes from Agni. According to As.Hr.Sha.3/50-54) [13], vitiation of Agni causes vitiation of *grahani*, which in turn causes illnesses.

Because all nutrients pass via the *Jathara* and are processed by *Jatharagni*, it is believed that *Jatharagni* is the most significant. The five elements found in food are broken down and prepared for use by the various *Dhatu paramanus* (tissues) by *Jatharagni*.

According to As.Hr.Su-12/8, *Jatharagni* is also in charge of separating the food into its essential components, or Prasad, and its waste products, or kitta, in our bodies [14].

The bioenergy, or *Dhatvagni*, in cells and their metabolic processes is intimately tied to *Jatharagni*, as is the tissue metabolism, or *Dhatu-Paka*, process in the end. When *Jatharagni* is in good health, all the *Dhatvagnis* depend on it. An overactive or underactive *Jatharagni* (*Tikshna*) or a hypoactive *Dhatvagni* (*Manda*) will result. Various ailments are caused by this disrupted activity. There are thirteen *Agnis*, but the most significant one is *Jatharagni*, which regulates the actions of the others. The position of *Jatharagni* determines the *Agnis* in totality (Cha. Chi. 15/39-40) [15].

According to its digestive function in humans, *Jatharagni* is also categorized into four types: *Vishamagni*, *Tikshanagni*, *Mandagni*, and *Samagni* (Cha. Chi. 15/51, [16]).

Dosha preponderance determines one of four Agni classifications.

1. *Samagnai*: a healthy digestive system and regular digestive fire, which signifies the balance of the three doshas. The nourishment of the human body is mostly the responsibility of *Samagni*.
2. *Vishamagni*: The digestion of food varies; sometimes it's OK, and other times it's not, even when eaten regularly. The reason for this is that *Vata* is not constant. *Vata Vyadhis* are more common in people with this Agni type.
3. *Teekshanagni*: When *Pitta* is predominant, the individual has excessive hunger and thirst and is more likely to suffer from *Pitta* diseases. When food isn't available, the body starts eating its own tissues.
4. *Mandagni*: the patient has so weak digestive abilities, made worse by the overpowering *Kapha*, that they have trouble breaking down even a little meal. *Kapha Vyadhis* are more common in people with this Agni type.



B. Bhutagni (Elemental Agni)

The *Bhutagnis* can use the five *Mahabhutas* found in food because they digest them. The five *Mahabhutas* are linked to distinct *Bhutagnis*, which break down food into its component parts and transform them into forms the tissues can use for sustenance [17]. This change occurs after the first processing by *Jatharagni*, which links the process of gross digestion with the absorption of nutrients.

Modern interpretations of *Bhutagni* point to its involvement in the effects of cellular and systemic circadian regulators on nutritional biotransformation, micro-level enzymatic conversions, and the body's ability to recognize and use elemental nutrients (including minerals, amino acids, and trace elements).

Every single one of our cells is made up of one of the five *mahabhutas*, or fundamental constituents. All cells, or *dhatu paramanu*, naturally contain these five *Bhutagni*. The five elements and their corresponding Agni or *bioenergies* are present in every food we consume. As a result, all the nutrients our bodies get from the outside world—including the five fundamental elements and their *Bhutagni* in our cells—are identical to each other. According to *Acharya Charak*, each of the five *Bhutagni* is responsible for digesting a certain percentage of the elements in food. *Bhutagni* digestion nourishes the body's unique *bhautika* elements, which are characterized by traits and qualities comparable to those of the *bhutas* (Cha. Chi. 15/13, 14) [18]. These *Bhutagnis* break down food after the *Jatharagni* in the duodenum and stomach has done its job. From a contemporary physiological standpoint, one might compare *Jatharagni's* activity to that of the stomach and duodenum during digestion and *Bhutagni's* action to that of the liver during the conversion of digested materials.

C. Dhatvagni (Tissue-specific Agni)

Dhatvagni is the metabolic force inherent in each *Dhatu* (body tissue) in *Ayurvedic* physiology. It helps each *Dhatu* undergo metamorphosis from the preceding one while maintaining its structural and functional integrity. *Dhatvagnis* act as biochemical intelligences for each tissue, coordinating selective absorption and rejection of nutrients. All the tissue functions depend on the strength of *Dhatvagni*. The seven *Dhatvagnis* are associated with each of the seven *Dhatus*, or tissues of the body. The *Dhatvagni* are the stages of metabolism in which precursor nutrients are converted into the next tissue components. They are here: *Rasa*, *Raktagni*, *Mamsagni*, *Medogni*, *Asthyagni*, *Majjagni*, and *Shukragni*. This paradigm of digestion in order is compatible with anabolism and tissue *remodeling*, and may also represent a metabolic state of a particular organ, hormonal shifts, and cycles of transcription in the genome. *Dhatvagni* demonstrates the synchronization of circadian cycles at the cellular and tissue levels, with periodic patterns observed in immune monitoring, protein synthesis, and regeneration. *Rasa Dhatvagni* is an example of the conversion of *Rasa* into *Rakta* as part of the seven tissue metabolic pathway of metabolizing the nutrients. A contemporary perspective of the notion of tissue-specific metabolic and enzymatic activity is compatible with *Dhatvagni*. Thus, for instance, the hepatocyte has cytochrome P450 enzymes for detoxification, and the osteoblast controls bone matrix formation with the enzyme alkaline phosphatase. All the activities of the tissues are regulated by the strength of their respective *Agnis*; hence, it is important that all metabolic functions remain intact [19].



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Dhatvagni may become disturbed and lead to abnormal tissue state, including undernourishment (*Kshaya*), overnourishment (*Vṛiddhi*) or toxicity (*Aamavat* conditions). These conditions might have been described as 'metabolic syndrome', 'lipotoxicity' or 'local inflammation' in the modern terminology [20]. Hence, *Dhatvagni* is an important component of the chain between modern molecular physiology and the Ayurvedic solution to tissue metabolism.

The bioenergy, or *Dhatvagni*, in each cell uses the fundamental nutrients in the *AnnaRasa*, or essence, of what we eat to create the *Rasa Dhatu* that is necessary for that cell. It is the specialty of each *Dhatvagni* to combine and alter substances appropriate to its own *Dhatu*. One may say this is an example of selective action. In his teachings on the seven *dhatu*s, *Acharya Charaka* explains that each bodily system has its own *Agni*, which it uses to absorb and nourish itself by digesting and transforming the materials given to it (Cha. Su. 28/15) [21].

4. CLINICAL SIGNIFICANCE OF AGNI

It is essential to determine *Agni* in Ayurveda before beginning therapy. When *Agni* is out of whack, *Ama* forms, which, in turn, causes metabolic problems, GI issues, and systemic ailments. Consequently, enhancing and standardising *Agni* via:

- *Deepana*: Herbs and remedies for the appetizer.
- *Pachana* helps the digestive system eliminate *Ama*.
- *Shodhana*: *Panchakarma* is a detoxification method.
- *Rasayana*: Revitalizing treatments that boost metabolic power.

A. Importance of Agni

Thus, *Agni* is not a digestive phenomenon but a metabolic regulator which influences cellular, systemic and gastrointestinal processes as well. The foundation on which physical strength, immunity, and intelligence depend. From the *Ayurvedic* perspective, understanding its role underscores the importance of preventive medicine, comprehensive treatments, personalized care, and related areas [22].

B. Modern Review

Carbs are broken down mechanically in the mouth by the chewing and enzymatically by the salivary amylase. Hydrochloric acid and pepsin start breaking down proteins when the bolus makes its way into the stomach via the oesophagus. To activate pepsin and kill pathogens, the stomach secretes hydrochloric acid, which helps maintain a pH between 1.5 and 3.5. The small intestine is responsible for most digestion and absorption; it receives the chyme produced in the stomach and gradually releases it. Trypsin, chymotrypsin, amylase, and lipase are digestive enzymes produced by the pancreas that break down proteins, carbs, and lipids, respectively. Liver bile improves lipid digestion by emulsifying lipids. Microvilli and villi line the small intestine, greatly increasing the surface area for absorption of minerals, vitamins, glycerol, amino acids, fatty acids, and monosaccharides into the bloodstream and lymphatic system [23].



C. Metabolism: Cellular and Systemic Processes

All the biochemical reactions that happen in living things to keep them alive are part of metabolism, which is mainly divided into anabolism and catabolism:

- Catabolism: The breakdown of molecules to obtain energy. Example: Glycolysis splits glucose into pyruvate, creating ATP.
- Anabolism: The synthesis of complex molecules from simpler ones, needed for tissue development and repair. Example: Protein synthesis from amino acids.

Mitochondria are the cellular powerhouses that carry out oxidative phosphorylation, transforming nutrients into ATP, the cell's energy currency. Some metabolic routes include glycolysis, the the Krebs cycle, the citric acid cycle, the electron transport chain, and lipid beta-oxidation. The following hormones play an important role in metabolic regulation:

- Insulin stimulates glycogenesis and lipogenesis and aids in glucose absorption.
- Glucagon: When fasting, it promotes the breakdown of glycogen and the production of glucose.
- Hormones produced by the thyroid increase the body's oxygen consumption and basal metabolic rate.
- In response to stress, the stress hormone cortisol promotes gluconeogenesis and lipolysis.

D. Thermogenesis and Energy Expenditure

The process by which the body generates heat, known as thermogenesis, is also aided by metabolism. At rest, the body requires a certain amount of energy—the basal metabolic rate (BMR)—to sustain all its critical activities. Many factors influence basal metabolic rate (BMR), such as gender, age, hormonal state, and body composition [24]. Total energy expenditure is comprised of three parts:

- The energy expended at rest is known as the basal metabolic rate (BMR).
- TEF, or the Thermic Effect of Food, is the amount of energy needed to break down food into its component nutrients.
- Expenditure of energy by means of physical activity, including movement and exercise.

5. CONCLUSION

It's fascinating to see the connection between *Jatharagni* and Basal Metabolic Rate, and how far traditional *Ayurvedic* knowledge has traveled since it was handed down. *Jatharagni* is the basic bioenergetic energy that regulates digestion, balances energy in the body, supplies nutrients to tissues, and supports the vitality of the whole person. It is a balanced condition (*Samagni*) that determines the optimal basal metabolic rate (BMR), the absorption of effective nutrition, and the avoidance of *Ama* (metabolic toxin) build-up, which is also the root cause of many diseases.

Changes in the strength of *Jatharagni*, as observed in healthy individuals, are influenced by factors such as age, stress, nutrition, lifestyle, diurnal/seasonal cycles, and constitution, and, as a result, affect their basal metabolic rate (BMR) and metabolic resilience. Mandagni and related hypometabolic states imply diminished energy expenditure and obesity related characteristics,



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while *Tikshnagni* implies a tendency towards hypermetabolism. This method offers a detailed view of the metabolic differences that can occur among people, beyond the simple calorie models.

It is possible that an *Ayurvedic* Agni evaluation, combined with a basal metabolic rate (BMR) measurement by an indirect calorimeter (IC), could guide specific treatments, such as the use of *deepana-pachana* medicines, meal timing, exercise and stress management, and other regimens designed to enhance Agni. Such approaches can benefit metabolic health, boost thermogenesis, and extend lifespan. Quantifying these relationships, validating diagnostic tools, and establishing evidence-based integrative methods will require further research, including interventional and observational studies across varied healthy adult populations. It is further established that *Jatharagni* plays a significant role in Basal Metabolic Rate (BMR), in accordance with the Ayurvedic notion that healthy digestion is the basic requirement for preventing disease.

6. AUTHOR(S) CONTRIBUTION

Dr. Zealous Mary comprehended and conducted the study, as well as evaluated and interpreted the results. Dr. Vathana wrote and updated the main manuscript. All authors read and approved the final version of the manuscript.

7. LIMITATIONS

The size of the sample was very small. The study was completely conducted on senior citizens.

8. RECOMMENDATIONS

Needs to conduct in Tai-chi exercise to assess the physical problems in old age people. Comparison research may be done to discover changes in adults and old age Recommend to do this study as qualitative research.

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11. PLAGIARISM POLICY

The authors declare that any kind of violation of plagiarism, copyright, and ethical matters will be handled by all authors. Journalists and editors are not liable for the aforesaid matters.

12. CONFLICT OF INTEREST

The authors declared that no potential conflicts of interest concerning the research, authorship, and/or publication of this article.



13. PROTECTION OF RESEARCH PARTICIPANTS

This study do not involve any such criteria or condition.

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