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The Gut–Skin Axis in Psoriasis: An Ayurvedic Perspective on the Role of Agni, Ama, and Intestinal Dysbiosis in the Pathogenesis of Kitibha Kushta

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Abstract

Introduction: The idea of the gut-skin axis has gained significance as a conceptual framework for understanding the interconnection between intestinal well-being, immune regulation, systemic inflammation, and various skin conditions. Psoriasis is an autoimmune-mediated dermatological condition characterized by immune system dysregulation, changes in the composition of the gut microbiome and high intestinal permeability. This perspective is explained by *Ayurveda* using the concepts of *Agni*, *Ama*, *Dosha* and *Rakta Dushti*. *Kitibha Kushta* can be understood in terms of alterations in the GI tract. **Objectives:** To discuss the significance of the gut-skin axis in psoriasis from a contemporary perspective and an Ayurvedic viewpoint, especially considering *Agni*, *Ama* and *Kitibha Kushta*. **Methods:** An integrative review of the topic was performed utilizing classical texts of *Ayurveda* like *Charaka Samhita, Sushruta Samhita and Ashtanga Hridaya*, along with recent scientific literature about psoriasis, gut bacteria, permeability and systemic inflammation. **Results:** Recent scientific research reveals that dysbiosis in the gut, intestinal barrier dysfunction, and immunologically mediated inflammatory responses play significant roles in the pathogenesis of psoriasis. The Ayurvedic literature presents similar concepts by discussing *Agnimandya*, which leads to the formation of *Ama*, *Srotorodha*, and the vitiation of *Rasa* and *Rakta Dhatu*. *Kitibha Kushta* elucidates the role of metabolic and dietary factors in the pathogenesis of dermatological conditions. **Conclusions:** The ancient Ayurvedic wisdom of *Agni* and *Ama* offers an elaborate explanation for understanding the gut-skin axis in psoriasis. An integrative strategy based on the principles of digestion correction and dietary regulation may be beneficial for the prevention and treatment of psoriasis. **Clinical significance:** Understanding the gut-skin axis underscores the importance of gut health, digestion, and systemic inflammation in the pathogenesis of psoriasis. The study of psoriasis from an Ayurvedic perspective, focusing on *Agni* and *Ama*, offers an integrated approach to its prevention and treatment.

Keywords- *Agni*, *Ama*, Gut dysbiosis, Gut-Skin Axis, *Kitibha Kushta*, Psoriasis

Introduction :

The human gastrointestinal tract performs several vital functions, including digestion, metabolism, immune regulation, and maintenance of systemic homeostasis. Recent scientific achievements have emphasized the importance of gut microbiota in its impact on multiple organs, including skin. The interaction between the intestine and the skin via immunological, metabolic, hormonal, and inflammatory signaling pathways is referred to as the gut-skin axis [1,2]. Psoriasis is an inflammatory skin condition with a chronic course, characterized by erythematous papules with silvery scaling, due to an immune response. Psoriasis affects about 2-3% of the global population and is known to be associated with systemic inflammation, metabolic disorders, obesity, insulin resistance, and stress. [3,4] Even though the precise etiology of psoriasis is multifaceted, recent research has shown gut microbial imbalance and intestinal permeability as the potential triggers of the disorder.Emerging evidence indicates that patients with psoriasis exhibit changes in their gut microbial profile, reduce microbial biodiversity, increased intestinal permeability, and elevated levels of proinflammatory mediators, including Tumor Necrosis Factor Alpha (TNF-alpha), Interleukin-17 (IL-17) and Interleukin-23 (IL-23) [5,6].According to Ayurveda, disease genesis occurs through a certain pathway that includes *Agni, Dosha, Dhatu, Mala* and *Srotas*. Digestive malabsorption, or *Agnimandya* is said to be the primary cause of many diseases. Digestive disturbances lead to *Ama,* which spread throughout the body and obstructs the pathways and functions of tissues.Regarding skin diseases, ancient Ayurvedic texts provide detailed descriptions of Kushta. *Kitibha Kushta* shows clinical similarities to psoriasis, including roughness, dryness, discoloration, and skin scaling. According to *Ayurveda*, inappropriate dietary practices, ingestion of incompatible foods, consumption of *Guru* and *Snigdha Ahara*, stress and disturbances in lifestyle are considered significant factors contributing to the development of *Kushta*. [7,8,9] The modern scientific concept of the gut-skin axis reflects the Ayurvedic concept of *Agnimandya*, which leads to the formation of *Ama* and causes *Dhatu Dushti*.Psoriasis is known to be a systemic inflammatory condition rather than simply a skin ailment. Apart from the typical skin symptoms, people living with psoriasis also display metabolic syndrome, obesity, insulin resistance, heart conditions, and inflammatory bowel disease. Several recent studies have shown alterations in the gut microbiota in patients with psoriasis, suggesting a possible role for gut dysbiosis in the pathogenesis of the disease. Gut bacteria are known to be active regulators of immune responses by producing microbial metabolites, maintaining epithelial barrier integrity, and controlling inflammatory pathways. This way, the gut-skin axis has become a promising tool for investigating psoriasis as a systemic disease and for identifying novel treatment targets. In Ayurveda, these discoveries mirror the concepts of *Agnimandya*, Ama production, and *Rakta Dushti*, which, together, describe the Patho mechanism of the development of skin diseases due to disturbances in the gastrointestinal system. *Kitibha Kushta* is one such skin ailment. [10,11, 12]

Aim and Objectives:

Aim:

To critically examine and analyze the concept of the gut-skin axis in psoriasis in view of Ayurveda.

Objectives:

1. To study the scientific literature available regarding the alterations in gut microbiome, gut dysbiosis, and gut-skin axis involvement in psoriasis.
2. To study the role of the Ayurvedic principles of *Agni* and *Ama* in the pathogenesis of skin diseases with particular attention to psoriasis.
3. To correlate the concept of *Kitibha Kuṣṭha* with the current concept of psoriasis.
4. To correlate gut dysbiosis and the inflammatory pathway with the Ayurvedic pathogenesis of psoriasis based on *Agni*, *Ama*, and *Rakta Duṣṭi* principles.
5. To study the relevance of improving digestion and metabolism in the management of psoriasis from an Ayurvedic and gut-skin axis perspective.

Materials and Methods of Review:

This particular study is based on a conceptual review that combines traditional knowledge from Ayurveda and modern science to understand the connection between the gut-skin axis in psoriasis and the concept of *Agni*, *Ama*, *Rakta Duṣṭi*, and *Kitibha Kuṣṭha* in Ayurveda. The objective of conducting this review is to combine various existing pieces of literature to find a conceptual connection between modern and Ayurvedicunderstanding of psoriasis.

Sources of Data

References from classical Ayurveda pertaining to *Agni, Ama, Kuṣṭha, Rakta Duṣṭi*, and causation of diseases were sourced through reliable sources like *Charaka Saṃhitā, Suśruta Saṃhitā, Aṣṭāṅga Hṛdaya*, and other commentaries on Ayurveda. Contemporary sources were collected using database searching tools like PubMed and Google Scholar.

Search Strategy

A combination of the Mesh terms, free text, and Boolean operators was used for searching through the literature. The primary search terms used were: "Gut dysbiosis AND Ayurveda," "Gut-skin axis AND Psoriasis," and "Psoriasis AND Ayurveda." Articles written in English and published between January 2016 and January 2026 were included in the search. The inclusion criteria for the articles were original research articles, review articles, meta-analysis, guidelines, and classical Ayurvedic literature related to the objectives of the current review.

Inclusion criteria

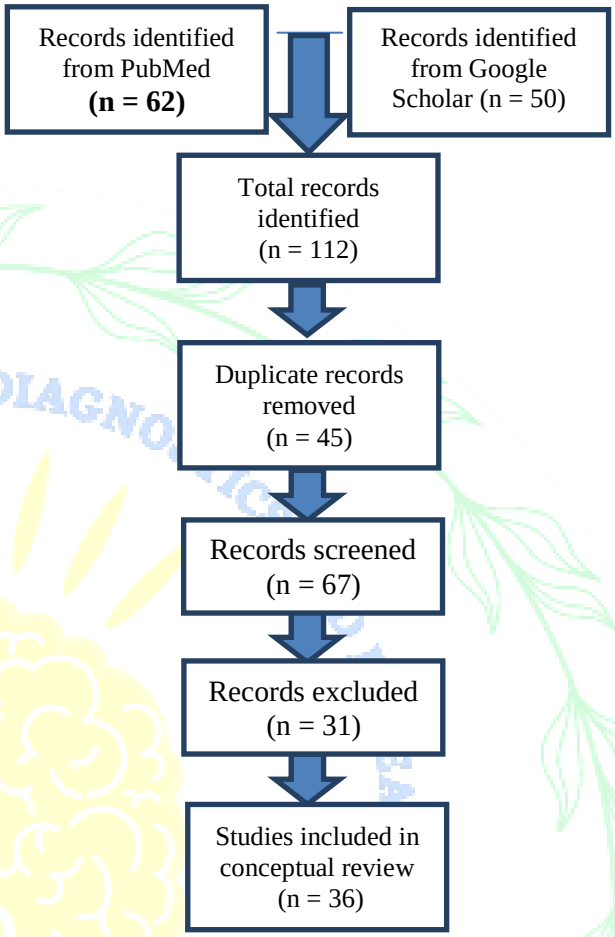
Studies that: investigated gut-skin axis in psoriasis ,examined gut microbiome, gut dysbiosis, gut permeability, immunomodulation, or systemic inflammation in psoriasis, studied cytokine pathway, IL-17, IL-23, TNF-α (Tumor Necrosis Factor Alpha) in psoriasis, which discussed the concepts in Ayurveda associated with *Agni, Ama, Rakta Dusṭi, Kuṣṭha*, or *Kitibha Kuṣṭha* or appeared in any peer-reviewed journal articles or classical Ayurvedic.

Criteria for Exclusion

These include: publications not written in English, abstracts of conferences and those abstracts which did not have complete papers, editorials, letters to the editor, and unpublished works, papers not specifically addressing psoriasis, gut–skin axis or Ayurveda concept correlation.

Study Selection :

Title and abstracts found from electronic databases were filtered based on their relevancy to the aim of the review. Articles that met the inclusion criteria were reviewed thoroughly for inclusion in the conceptual synthesis. In total, 112 articles were collected from electronic databases, including 62 articles from PubMed and 50 articles from Google Scholar. Out of 112 articles, 45 duplicate articles were removed, leaving 67 articles to be screened. Among 67 articles, 31 articles were discarded as they were not relevant to the review question or did not meet the inclusion criteria. Thus, 36 articles were included in the conceptual review. Classical Ayurvedic texts were chosen due to their relevancy to *Agni, Ama, Rakta Dusti*, and *Kitibha Kusṭha*. The study selection process is illustrated using PRISMA 2020 flowchart as mentioned in Figure1.



PRISMA 2020 flow chart – Figure 1

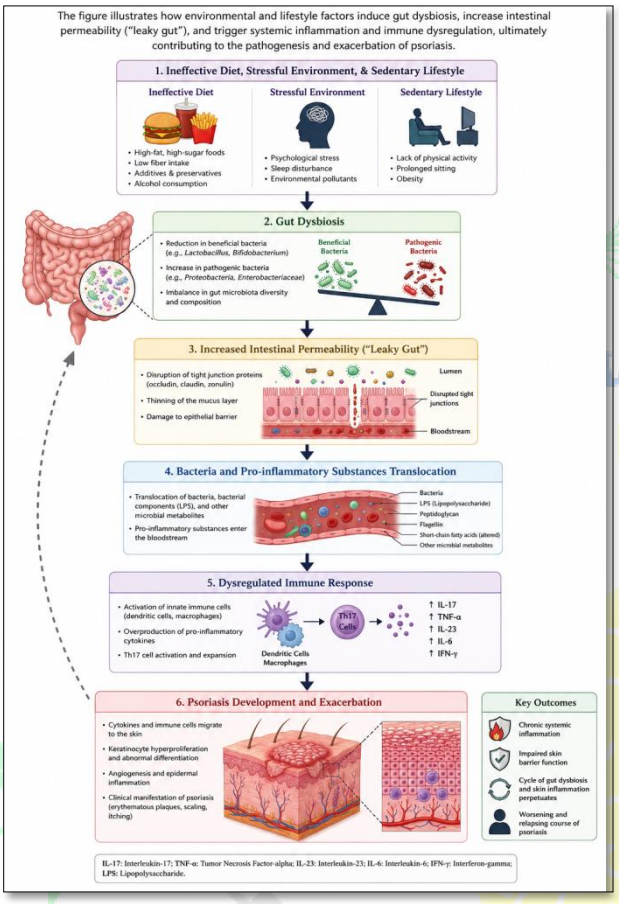
Review Results:

1. Gut–Skin Axis: Modern Understanding

The gut–skin axis is defined as the relationship between gut microbiota, immune system mechanisms and skin physiology. The gut microbiome includes billions of organisms that facilitate metabolic processes, modulate immunity and maintain mucosal integrity. [4, 5]

Normal functioning of gut microbiota provides Immunological tolerance, Formation of short-chain fatty acids, Structural integrity of the gut barrier and Regulation of Inflammation. Any imbalance in the microbial flora, or gut dysbiosis, can lead to the development of inflammatory diseases such as psoriasis.

Gut-Skin axis: (Figure -2)



(Figure 2: Pathogenesis of psoriasis)

a. Gut Dysbiosis

Individuals with psoriasis exhibit an imbalance in the microbiota, with a decline in beneficial bacteria and an increase in pro-inflammatory bacteria.

b. Increased Gut Permeability

Intestinal tight junction damage leads to increased gut permeability, or leaky gut syndrome, causing the release of toxins, bacterial by-products, and inflammatory molecules into the bloodstream.

c. Inflammation

Circulating inflammatory mediators stimulate pathways that drive skin inflammation. High levels of cytokines, such as IL-17, IL-23, and TNF-alpha, are crucial for the development of psoriasis. [13]

d. Dysregulation of Immunity

Gut-associated lymphoid tissue (GALT) can influence the systemic immune response and contribute to the development of chronic inflammatory skin conditions.

Gut Microbiota in Psoriasis:

The human intestine harbors billions of microorganisms, collectively known as the gut microbiota. The main bacterial phyla of the gut include Firmicutes, Bacteroidetes, Actinobacteria, and Proteobacteria. They are vital for nutrient metabolism, vitamin production, maintenance of intestinal barrier function, and regulation of the immune response. The balanced composition of the gut microbiota is important for immune tolerance, as it produces short-chain fatty acids (SCFAs) that regulate the function of regulatory T cells (Tregs). [14,15, 16] The latest studies have revealed substantial changes in the gut microbiota in patients with psoriasis. This microbial imbalance, referred to as gut dysbiosis, involves reduced microbial diversity and changes in certain bacterial species. Psoriatic individuals were found to have decreased levels of beneficial microorganisms, including Akkermansia muciniphila, Faecalibacterium prausnitzii, and Bacteroides species. [17, 18, 19,20]

Akkermansia muciniphila is particularly significant because it contributes to the formation of the intestinal mucus layer and helps maintain intestinal barrier function. A reduction in their numbers can negatively affect intestinal permeability and lead to the translocation of bacterial products into systemic circulation. In addition, Faecalibacterium prausnitzii produces anti-inflammatory metabolites and helps maintain intestinal immune homeostasis. Their reduction is associated with chronic inflammatory diseases such as psoriasis. [21,22]

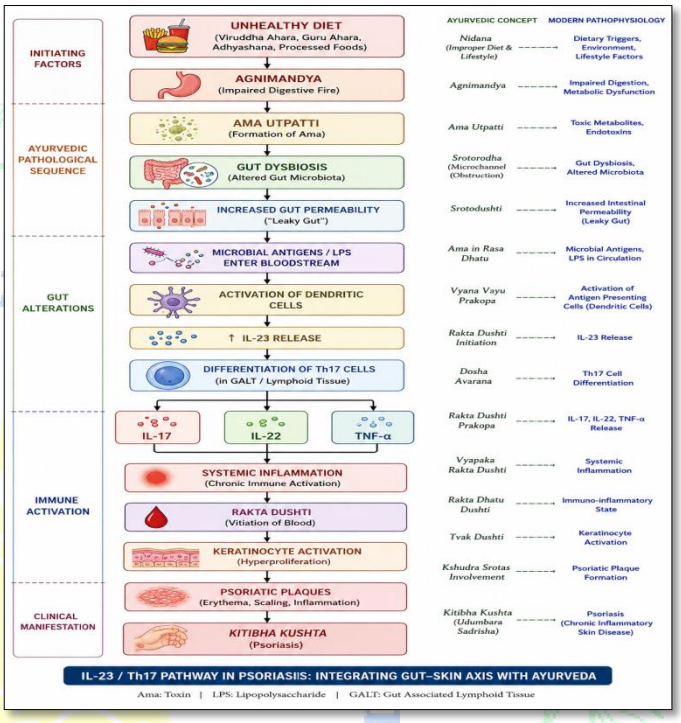
Several mechanisms by which dysbiosis affects psoriasis can be discussed. First, changes in the composition of the microbial population can impair

intestinal barrier function and increase tight junction permeability, allowing the transfer of bacterial lipopolysaccharides (LPS) and other inflammatory mediators into the systemic circulation. In turn, these mediators stimulate an immune response, causing systemic inflammation. Second, dysbiosis affects microbial metabolite production, specifically SCFAs (Short-Chain Fatty Acid), leading to decreased anti-inflammatory signaling and increased risk of chronic inflammation. [23, 24, 25]

Multiple studies have shown a link between changes in gut microbiota and psoriasis severity. Lower microbial diversity correlates with disease activity and increases levels of inflammatory markers. Therefore, changes in the intestinal microbial community can be considered a cause of psoriasis. [26,27]

According to Ayurveda, gut dysbiosis could be considered a sign of *Agnimandya*, leading to the production of *Ama*. Poor metabolism and digestive function disrupt the balance of the gastrointestinal system, leading to the accumulation of toxic waste products and disturbances in physiological processes. Formation of *Srotorodha* and *Dhatu Dushti* is like the concept of microbial dysbiosis and intestinal dysfunction in modern medicine. Thus, modern research on gut microbiota supports the idea that disturbances in the gastrointestinal system can lead to systemic and skin diseases, such as *Kitibha Kushta.*

Immunological mechanism in Psoriasis as described in Figure 3.



(Figure 3. Immunological Basis of the Gut–Skin Axis in Psoriasis and its Ayurvedic Correlation Unhealthy eating habits and *Viruddha Ahara* cause *Agnimandya* and *Ama Utpatti*, which causes dysbiosis and leaky gut syndrome. Antigenic proteins and LPS gain access to the bloodstream, triggering the dendritic cells to secrete IL-23 and differentiate Th17 cells. The IL-17, IL-22 and TNF-α secreted by these Th17 cells leadto systemic inflammation, *Rakta Dushti* and keratinocyte activation, causing psoriasis Lesions and eventually lead to *Kitibha Kushta*.)

At present, psoriasis is viewed as an immune-inflammatory disease where dysfunction of both innate and adaptive immunity is involved in its pathogenesis. The IL-23/Th17 axis has emerged as the key immunological mechanism mediating psoriasis inflammation. [28,29,30] The intestinal microbiome, under normal conditions, helps maintain immune tolerance and control inflammatory responses. But gut dysbiosis alters

the interaction between the intestinal microbiome and the immune system. Intestinal hyperpermeability promotes the passage of microbial antigens, endotoxins, and proinflammatory substances through the intestinal barrier, triggering immune cells in gut-associated lymphoid tissue (GALT). [31,32] Dendritic cell activation within the intestines initiates the production of interleukin-23 (IL-23), an important cytokine responsible for differentiation and proliferation of T-helper 17 (Th17) cells. In turn, Th17 cells release inflammatory cytokines such as IL-17A (Interleukin-17A), IL-17F(Interleukin-17F), IL-22(Interleukin-22) and TNF-alpha. All these cytokines circulate throughout the body to facilitate chronic inflammation at the remote site, which is usually the skin. [33,34,35] IL-17(Interleukin-17) is especially significant in the development of psoriasis. This cytokine is responsible for stimulating keratinocyte proliferation, inflammatory mediator production and neutrophil recruitment into psoriatic lesion. IL-23 functions as a maintenance cytokine for Th17and TNF-alpha intensifies inflammatory cascades, thereby increasing the action of IL-17. Therefore, increased levels of IL-17, IL-23and TNF-alpha are always present in psoriatic patients and become a cornerstone of several biological treatments. [36,37,38]

According to the gut-skin axis, chronic intestinal inflammation causes systemic immune activation by constant stimulation with microbial and inflammatory mediators. As a result, the response from Th17 cells is maintained and leads to chronic inflammation and the development of psoriatic plaques. [39,40]

There is emerging research indicating that microbial metabolites influence the differentiation of T regulatory cells and Th17 cells. Inadequate production of short-chain fatty acids owing to dysbiosis in the gut can weaken immune regulatory responses and cause proinflammatory reactions. This results in chronic immune activation. [41]

From the perspective of Ayurveda, this phenomenon may be related to *Ama*-induced *Dosha* imbalance and *Rakta Dushti*. *Agnimandya* causes the formation of *Ama*, which subsequently circulates throughout the body and affects physiological balance. Accumulated *Ama* triggers inflammation which, like cytokine-related immune dysregulation, is explained by modern immunology. Increased levels of IL-17, IL-23and TNF-alpha can be considered signs of biological manifestation of chronic *Dosha* imbalance and *Rakta* vitiation. Therefore, current knowledge of immunology confirms the hypothesis that disorders occurring in the gastrointestinal tract have an impact on systemic immunity and can play a significant role in the development of psoriasis.

2. Psoriasis: Current Concept

Psoriasis is a chronic inflammatory disorder of the skin featuring hyper proliferative process of keratinocytes. Clinical Findings such as Red patches, silver scales, Dryness and pruritus with Persistent and recurring pattern. Associated Factors are hereditary tendency, Excess weight, Stress, Tobacco smoking, alcohol consumption, Western dietary habits and metabolic syndrome. [42]

Current evidence suggests that psoriasis is characterized by both skin inflammation and alterations in the gut, such as gut microbial

dysbiosis, decreased microbial diversity, changes in abundance of particular microbial species, and increased intestinal permeability. There is evidence from a number of clinical and observational studies showing that there are particular changes in gut microbial composition in patients with psoriasis and psoriatic arthritis in comparison with healthy participants. Specifically, Scher et al. found that patients with psoriatic arthritis had lower bacterial diversity and microbial composition similar to that seen in inflammatory bowel disease, thus pointing to a connection between psoriasis and gut dysbiosis. Tan et al. found that Akkermansia muciniphila was a unique microbial signature in psoriasis, whereas Codoner et al. revealed differences in gut microbial composition in psoriasis and healthy subjects. Moreover, based on literature reviews, there are consistent findings of decreased numbers of beneficial bacteria, alterations in short-chain fatty acid metabolism, impairment of the intestinal barrier, and chronic low-level inflammation as key features of the gut-skin axis in psoriasis. The major results of the research on the connection between psoriasis and gut microbiota alterations are presented in Table 1. [43, 44, 45,46,47,48,49]

Table 1. Studies demonstrating relationship between psoriasis and changes in gut microbiota and gastrointestinal inflammation.

Table- 1 Studies demonstrating relationship between psoriasis and changes in gut microbiota and gastrointestinal inflammation

Author, year	Study type	Major findings
Scher et al., 2015 [12]	Observational study in psoriatic arthritis	Reduced gut bacterial diversity in psoriatic arthritis patients was shown. This microbial profile indicated dysbiosis observed in inflammatory bowel disease and reflected the close relationship between psoriatic disease and the alteration in gut microbiome.
Tan et al., 2018 [13]	Clinical microbiome study	Discovered that A. muciniphila is one of the characteristic microbes of psoriasis, indicating alteration in the gut microbe composition in such individuals.
Codoñer et al., 2018 [14]	Comparative clinical study	Discovered significant alterations in the gut microbial composition of psoriasis patients compared to healthy individuals, confirming gut dysbiosis of psoriasis patients.
Hidalgo-Cantabrana et al., 2019 [3]	Review article	Summary of evidence for the correlation between psoriasis and gut dysbiosis, decreased beneficial microbiota, and immune dysregulation, highlighting the relevance of the gut–skin axis theory in disease pathology.
Buhaș et al., 2022 [5]	Review article	Found that patients with psoriasis have gut dysbiosis, low diversity, impaired intestinal barrier integrity, and increased inflammatory signaling, contributing to disease development.
Woo et al., 2022 [19]	Review article	Discussed the relationship between the gut and skin in psoriasis, highlighting intestinal permeability, gut dysbiosis, and immune activation by cytokines as key factors connecting the two sites.
Sikora et al., 2020 [20]	Updated review	Pointed out the changes observed in microbiome composition, decrease in short-chain fatty acids-producing bacteria, immune dysregulation, and inflammation in psoriasis patients.

3. The Concept of *Agni* in *Ayurveda*

The concept of *Agni* is the key factor that governs digestion, metabolism, tissue nutrition and immunity.

Types of *Agni*: *Sama Agni* - Normal Digestion, *Mandagni* - Weak Digestion, *Tikshnagni* - Strong Digestion, *Vishamagni* - Irregular Digestion.

Out of all these types, *Mandagni* plays an important role in the formation of diseases.

If *Agni* works normally, then: Digestion will be proper, Nutrient Absorption will be proper, Tissues will be nourished properly, *Ojas* and immunity will remain healthy.

4. Theory of *Ama*:

Ama represents the poorly digested and assimilated toxic substance formed due to *Agnimandya*.

Properties of *Ama* - *Guru* (weight)**,** *Picchila* (sliminess)**,** *Avila* (cloudiness)**,** *Srotorodhakara* (obstruction).

Ama flows in the body and causes: Obstruction in channels, Nutritional deficiency in tissues, Inflammation and Disease formation.

The idea of *Ama* is comparable to inflammatory by-products, endotoxins and immune stimulants formed due to intestinal malfunction.

Rakta is viewed as one of the most important *Dhatus* responsible for providing nourishment, energy, healthy coloration of the skin and skin integrity in the Ayurvedic medical system. In classical Ayurvedic literature, there are many mentions about the close connection between *Rakta* and *Twak* and several dermatological conditions caused by *Rakta Dushti*. [50,51]

Agnimandya causes development of *Ama* and its entering *Rasavaha* and *Raktavaha Srotas*. The presence of *Ama* in the *Rakta* causes alterations called *Rakta Dushti*. The manifestations of the vitiated *Rakta* condition include discoloration of the skin, itching, inflammation, burning sensation and different types of *Kushta*. [52,53, 54]

The pathogenesis of *Kitibha Kushta* includes dominance of *Vata-Kapha* and the involvement of *Rakta*. The circulation of the *Ama* through the body and obstruction of the microchannels lead to malfunctioning of the skin nourishment processes, causing roughness, dryness, desquamation and discoloration of the skin. These symptoms are like signs of psoriasis. [55]

Current studies have shown that psoriasis is associated with systemic inflammation that includes increased concentrations of inflammatory cytokines, oxidative stress, endothelial dysfunction and immune system dysregulation. Elevated concentrations of TNF-alpha, IL-17and IL-23 lead to chronic inflammatory processes not only in the skin but also systemically. [56,57]

This way, *Rakta Dushti* in Ayurveda can be linked to systemic inflammation in psoriasis. As vitiated *Rakta* causes pathological processes to spread through the body, inflammatory mediators in the circulation contribute to immune activation and the development of diseases. This connection can establish a link between ancient Indian medicine and immunopathology.

Therefore, *Rakta Dushti* can be considered an intermediary stage between *Agnimandya*, formation of *Ama* and *Kitibha Kushta* manifestation. Knowledge of the importance of *Rakta* makes the theory of the gut-skin axis in Ayurveda clearer and explains possible methods of its correction.

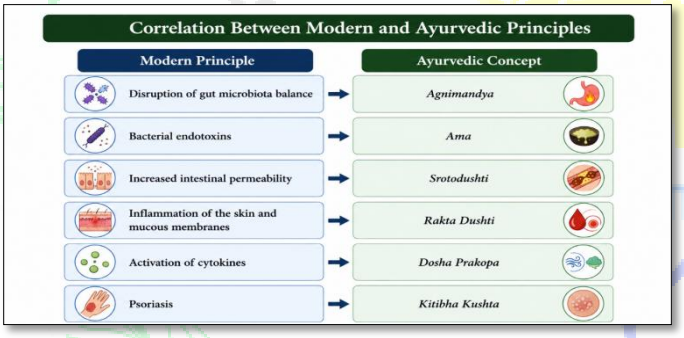
5. *Kitibha Kushta* and Psoriasis

According to Ayurveda, *Kushta* describes a variety of skin conditions characterized by *Dosha* and *Dhatu* derangement. *Kitibha Kushta* shows clinical similarity with psoriasis.

Clinical Symptoms of *Kitibha Kushta* are *Shyava Varna* (darker pigmentation), *Kina Khara Sparsha* (roughness), *Parushata* (dryness).

Nidana of Kushta: Some causes that are known to cause *Kushta* according to ancient *Ayurvedic* literature are; *Viruddha Ahara*, over consumption of *Guru* and *Snigdha Ahara, Adhyashana, Ajirna Ahara Sevana*, Day sleep (*Diwaswapna*), Stress and emotional disturbances. They weaken the *Agni*, causing *Ama* production. [58, 59, 60]

6. The Ayurvedic Concept could be correlated with Modern Concept as described in Figure-4.



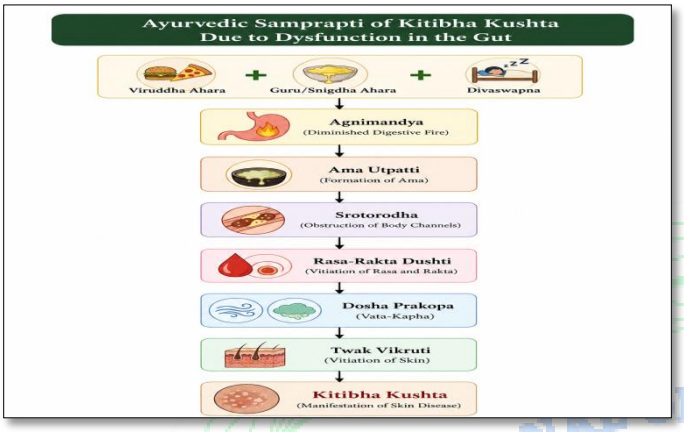
(Figure-4 –Correlation with Modern Concept as described)

Current developments in immunology have revealed that the IL-23/Th17 pathway represents the key molecular mechanism behind the development of psoriasis. Dysbiosis and increased permeability of the intestine allow for the transfer of microbial antigens, endotoxins and other inflammatory substances into the systemic circulation. These substances trigger activation of antigen-presenting cells (primarily dendritic cells) in the gut-associated lymphoid tissue (GALT). In this case, a series of inflammatory processes occurs. Activated dendritic cells secrete the IL-23 cytokine, which is important for differentiation, proliferation and survival of T-helper 17 (Th17) cells. [61,62, 63]

The activated Th17 cells start producing several pro-inflammatory cytokines such as IL-17A, IL-17F, IL-22and TNF-α. Among these cytokines, IL-17 serves as an effector molecule that causes hyperproliferation of keratinocytes and maintenance of psoriasis. It activates keratinocytes to produce chemokines, antimicrobial proteins and other inflammatory mediators; thus, causing a continuous inflammatory circle in the skin. On the other hand, TNF-α stimulates further inflammatory signal transduction and leukocyte migration, while IL-23 keeps the ongoing immune response mediated by Th17 cells. High concentrations of these cytokines have been found in individuals who suffer from psoriasis. [64,65,66]

In terms of Ayurveda, this inflammation cascade can be interpreted as the systemic response arising due to the development of *Ama* and *Rakta Dushti* due to *Agnimandya*. Chronic formation of *Ama* due to the impairment of digestion may cause *Srotorodha* and *Dosha Vridhi*, eventually leading to the involvement of *Rasa* and *Rakta Dhatu*. This inflammation process is quite similar to the increased secretion of IL-17, IL-23and TNF-α seen in patients with psoriasis. Hence, the IL-23/Th17 pathway in modern medicine can be considered as the manifestation of *Ama*, *Rakta* and *Kitibha Kushta* pathology in Ayurveda. [67,68,69,70]

The process of pathophysiology can be explained as mentioned in Figure- 5.



(Figure 5. Ayurvedic Pathogenesis of *Kitibha Kushta* showing the importance of *Agnimandya* and *Ama* in manifestation of skin disease.)

Discussion:

This review demonstrates remarkable parallels between the modern theory of the gut-skin axis and the Ayurvedic concepts of *Agni* and *Ama*.

Modern concepts of gut-related inflammation and classic Ayurvedic theory of disease development have much in common. The latest scientific achievements tend to confirm the crucial role of intestine in regulation of immunity, while Ayurveda focuses on the importance of *Agni* for maintaining a good state of health. Dysfunction of *Agni* causes creation of *Ama*, which in turn affects various physiological processes and results in development of diseases. Such ideas correspond to the modern notions of the influence of gut dysbiosis, permeability of the gut barrier and bacteria endotoxins translocation on development of inflammatory processes.Another common feature is the notion of systemic inflammation. The modern IL-23/Th17 axis, considered a key component of psoriasis, shows how intestinal changes could affect distant tissues by means of immune mechanisms. IL-17, IL-23 and TNF-α contribute to keratinocyte proliferation and chronic inflammation in psoriatic skin lesions. It can be compared with the mechanism of development of *Kitibha Kushta* according to Ayurveda, when *Ama* moves from intestine to *Rasavaha* and *Raktavaha Srotas*, causing *Rakta Dushti* and leading to appearance of *Kitibha Kushta*. Thus, modern ideas about inflammation caused by cytokines confirm the classical Ayurvedic theories of systemic disease development. [71, 72,73,74]

Current science shows that the gut microbiome is integral to immune regulation and systemic homeostasis. Changes in microbial composition result in increased intestinal permeability and inflammation, leading to psoriasis. [75, 76, 77]

Similarly, according to Ayurveda, impaired digestion is the initial mechanism in disease causation. *Agnimandya* leads to *Ama* production, characterized by obstruction and inflammation. This substance enters the bloodstream through *Rasavaha* and *Raktavaha Srotas* and precipitates dermatological conditions.

Kitibha Kushta pathogenesis is a systemic disease process rather than a purely cutaneous one. Dietary antagonism, poor digestion and tissue disturbance mirror the current model of gut-induced inflammation.

Elevated levels of inflammatory cytokines, such as TNF-alpha, IL-17 and IL-23, have been found in psoriatic patients. [78,79,80]. These molecules can be viewed from an Ayurvedic point of view as symptoms of chronic *Dosha* aggravation and *Rakta Dushti*, due to *Ama* build-up.

Moreover, behavioral risk factors such as psychological stress, sleep disorders, physical inactivity and inappropriate nutrition affect the

gastrointestinal tract and the severity of psoriasis. Ayurveda advocates *Nidana Parivarjana*, normalization of *Agni* and detoxification of *Ama* as key therapeutic approaches.

While there is increasing evidence of gut-skin interaction, integrative research that correlates changes in gut microbiota composition with Ayurvedic concepts of *Agni*, *Ama* and *Prakriti* is still less. Such future research might lead to the discovery of objective markers for an Ayurvedic evaluation and integrative dermatology.

Role of Dietary Intake, Gut Function and *Viruddha Ahara*:

Diet is crucial not only for the proper functioning of the gastrointestinal tract but also for the development of inflammatory disorders. The current research shows that high consumption of saturated fats, refined carbohydrates, processed foods and sugars can influence the composition of gut microbiota, damage intestinal epithelial barrier and cause systemic inflammation. The diet mentioned above is characterized by a high risk of developing obesity, metabolic syndrome and psoriasis. [81,82,83]

It was also shown that westernized dietary intake leads to low gut microbial diversity and increased permeability of the intestinal wall. Excessively high consumption of processed foods stimulates the growth of the inflammatory bacteria and reduces the number of the beneficial microorganisms that maintain immune balance. Several dietary factors are mentioned in Ayurveda as causing disturbances in the proper functioning of digestion and triggering disease development. Among them, *Viruddha Ahara* (incompatible foods), *Adhyashana* (overeating), *Ajirna Ahara Sevana* (consumption of food without complete digestion of previous meal), excessive intake of *Guru Ahara* and *Snigdha Ahara* plays a special role in *Kushta* causation. [84, 85]

Viruddha Ahara is a combination of incompatible foods in respect of properties, processing, quantity, time or digestive action. It is known from the classical literature that the habitual intake of incompatible foods leads to disturbance of *Agni*, *Ama* formation and provokes the development of chronic diseases, including skin ones. [86, 87, 88]

Similarities between *Viruddha Ahara* and the phenomenon of diet-induced inflammation can be found. Both approaches state that improper diet leads to disruption of normal digestive process and metabolism and production of inflammatory substances that negatively influence general condition of a patient. *Agnimandya*, *Ama* formation and *Srotorodha* coincide with the concepts of dysbiosis, metabolic disturbances and chronic inflammation. [89, 90]

In addition, dietary correction is considered to play an essential role in modern and Ayurvedic approach to therapy. In Ayurveda, there is an emphasis on *Nidana Parivarjana*, intake of proper food and digestion in a healthy manner. Thus, diet becomes the important linkage between the two diseases and proves the theory that diet regulation is very important for healthy digestion as well as healthy skin.

Implications for Future Treatment Approaches

The emerging information regarding the gut-skin axis could serve as the basis for formulating an integrative strategy to manage psoriasis. In the light of Ayurveda, the interventions to increase *Agni* and

decrease *Ama* could be theoretically applicable, especially in cases of patients with symptoms indicating the presence of digestive disorders and metabolic dysfunctions. The diet modifications in accordance with Ayurveda and interventions to restore gut microbiota, such as probiotics, prebiotics, and nutrition interventions, could impact the balance in the intestine and systemic inflammatory response. Furthermore, the lifestyle modification and reduction of stress can be beneficial due to the established involvement of psychosocial stress in the development of gut malfunction and psoriasis. The *Pancakarma* interventions can also deserve attention as supportive measures, but their applicability should be studied further. Future research should be oriented towards the clinical and translational studies regarding the connection between changes in gut microbiota and Ayurvedic concepts of *Agni, Ama,* and *Kuṣṭha samprapti*.

Conclusion:

Understanding of the interaction between the gastrointestinal system and skin would benefit from the knowledge of the gut-skin axis phenomenon. In psoriasis pathogenesis, there are emerging evidences for the influence of gut dysbiosis, intestinal permeability and immune dysregulation, especially due to the activation of inflammatory pathways like IL-23/Th17 pathway. Similar pathogenetic processes occur in the context of Ayurveda with the involvement of *Agnimandya, Ama, Srotorodha,* and *Rakta Duṣṭi,* providing another conceptual basis to understand the mechanisms of psoriasis beyond the scope of just skin disease. Such similarities point out that psoriasis should be considered as systemic inflammatory disorder, having significant involvement of the gastrointestinal tract and immune system. Integration of such elements as digestive physiology, nutrition, lifestyle regulation, and immune-inflammation modulation could have an important role in the treatment of this disorder. Nevertheless, further scientific study is necessary to validate these conceptual connections and provide evidence-based integrative treatment approaches.

Key message:

Psoriasis is not a local skin disease but systemic inflammatory disorder, in which gut dysbiosis, immune dysregulation and disorders of digestive-metabolic processes take place, making gut-skin axis and Ayurvedic concepts of *Agni* and *Ama* important perspectives for further research.

Clinical significance:

The knowledge gained from the gut-skin axis broadens the scope in the management of psoriasis since it focuses on the significance of gastrointestinal wellbeing, immunity regulation and systemic inflammation as key factors contributing to the development of disease. The Ayurveda principles relating to *Agni, Ama* and *Kitibha Kushta* share close similarities with the modern-day knowledge about gut dysbiosis and inflammatory pathways that play an important role in psoriasis pathogenesis. Therefore, an integrative approach can help understand the relevance of addressing the problem related to poor digestion, dietary practices and lifestyle interventions in the management of psoriasis.

Strengths and Limitations of the Review

There are a number of strengths to this review.

Firstly, it presents an integrated conceptual synthesis of the modern evidence regarding the gut-skin axis in psoriasis along with classical Ayurveda concepts of *Agni*, *Ama*, *Rakta Dusti*, and *Kitibha Kuṣṭha*. This allows a broader view of the mechanisms of development of psoriasis as a system-wide condition rather than simply a skin disorder, since the review connects the concepts of the modern biomedical studies, such as gut dysbiosis and leaky gut syndrome, and the principles of disease development according to Ayurvedic tradition. Secondly, the review combines the evidence from modern scientific databases and classical Ayurvedic literature, thus providing the cross-disciplinary interpretation which can help develop hypotheses for further integrative studies. Finally, by indicating the possible significance of digestive-metabolic disorders, imbalanced gut microbiota, and inflammatory pathways in the development of psoriasis, the review opens up certain avenues for translation and clinical studies in the framework of integrative medicine. However, there are also some important limitations associated with this review. First of all, the present review is a narrative conceptual review where many suggested correlations between the constructs of Ayurveda and the mechanisms of modern biomedicine have not been validated yet. At the moment, there is a lack of well-designed clinical and translational studies investigating the connection between Ayurvedic parameters *(Agni, Ama,* and *Rakta Dusti)* and the objective parameters of gut microbiome composition, intestinal permeability or inflammation in patients with psoriasis. Besides, at the moment, most of the studies of the gut microbiome in patients with psoriasis are observational and are characterized by heterogeneous sample size, methodology and microbial signature reported. Another problem is that there are no standardized and universally accepted markers for some of the Ayurvedic constructs like *Ama*. Moreover, as this review includes only scientific literature in English, there is a chance that this study is biased because of the publication bias, language bias and interpretative bias. Thus, the suggested conceptual correlations should be considered hypothesis-generating, and more validation studies are needed.

Scope for Future Research:

Future studies should seek to make objective associations between microbiome structure and traditional Ayurvedic parameters such as *Agni, Ama, Prakriti* and *Rakta Dushti*. Research involving the examination of microbiome variations in response to Ayurvedic therapy might offer insight into the underlying biological principles behind traditional treatment methods. Further research into the effects of food control, *Deepana-Pachana* treatment, *Panchakarma* treatment and *Rasayana* treatment on microbiome composition and inflammation might be useful. These studies may help create an integrative framework that combines the strengths of traditional medicine and conventional biomedicine to manage psoriasis.

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