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CRITICAL ANALYSIS OF *AGNI* WITH REFERENCE TO INFLAMMATORY BOWEL DISEASE: A SYSTEMATIC REVIEW

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ABSTRACT:

Background: Inflammatory Bowel Disease (IBD), comprising Ulcerative Colitis and Crohn's Disease, is a chronic immune-mediated gastrointestinal disorder with rising global prevalence. Despite advances in biologic therapy, sustained remission remains challenging. *Ayurveda* emphasizes *Agni,* the digestive and metabolic principle, as central to health and disease, particularly gastrointestinal disorders.

Objective: To critically analyze the Ayurvedic concept of *Agni* in relation to the etiopathogenesis and clinical manifestations of IBD using classical Ayurvedic literature and contemporary biomedical evidence.

Methods: Classical *Ayurvedic* texts (*Charaka Samhita, Susrutha Samhita, Ashtanga Hridaya*) were reviewed for references to *Agni*, *Grahani*, and *Atisara*. Scientific literature was analyzed for evidence related to IBD pathogenesis, immune dysregulation, gut microbiota, epithelial barrier dysfunction, and anti-inflammatory effects of Ayurvedic interventions.

Results: Disturbance of *Agni* (*Agnimandya*) leads to *Ama* formation and *Srotodushti*, which parallels dysbiosis, impaired epithelial barrier integrity, and chronic immune activation in IBD. Pro-inflammatory cytokines such as TNF-α and IL-6 correspond functionally to *Ama-prabhava*. Ayurvedic herbs such as *Curcuma longa* and *Boswellia serrata* demonstrate anti-inflammatory and immunomodulatory effects relevant to IBD.

Conclusion: The concept of *Agni* provides a comprehensive framework for understanding IBD pathogenesis. Integrating *Agni-based* assessment with biomedical markers may support personalized and integrative approaches in IBD management.

Keywords: *Agni*, *Ama*, Crohn's Disease, *Grahani*, Inflammatory Bowel Disease, Ulcerative Colitis

INTRODUCTION:

Inflammatory Bowel Disease (IBD) is a chronic, relapsing immunological disorder of the gastrointestinal tract. Its pathogenesis involves a constellation of genetic susceptibility, immune dysregulation, intestinal barrier breakdown, and gut microbiota imbalance. Standard treatments (corticosteroids, immunosuppressants, biologics) target inflammatory pathways but often have limitations, including incomplete remission, adverse effects, and high cost.

Ayurveda's core principle of *Agni* encompasses digestion, metabolism, and systemic transformation. Classical texts describe that when *Agni* is impaired (*Agnimandya*), undigested metabolic residues called *Ama* accumulate and disrupt physiological channels (*Srotas*), leading to disease. Analogous to modern concepts of dysbiosis and barrier disruption, *Agnimandya* may help explain pathogenic processes in IBD.[1]

CONCEPT OF *AGNI* IN AYURVEDA

Ayurvedic literature defines *Agni* as the principle of transformation governing digestion, absorption, and assimilation. Multiple types include:

- ***Jatharagni:*** Central digestive fire in the gastrointestinal tract.
- ***Dhatvagni:*** Tissue-level metabolic fire.
- ***Bhutagni*:** Elemental transformation of food into *dosha*-compatible forms.

Balanced *Agni* ensures proper nutritive assimilation and immune competence; impaired *Agni* results in *Ama*, a toxic metabolic residue that acts as a key pathological agent.

GRAHANI: ANATOMICAL AND FUNCTIONAL PERSPECTIVE

Grahani is described as the seat of *Agni* and is functionally responsible for retaining food until proper digestion occurs. It corresponds anatomically to the small intestine. When *Agni* is impaired, *Grahani* fails to regulate digestion, resulting in chronic diarrhea, malabsorption, abdominal pain, and weight loss, features commonly observed in IBD.

GRAHANI ROGA AND *GRAHANI DOSHA*: CLASSICAL REFERENCES AND IBD CORRELATION

Grahani Roga is comprehensively described in *Charaka Samhita Chikitsa Sthana*, which defines it as a condition arising from weakened *Agni* at the *Grahani* seat, manifesting with alternating diarrhea and constipation, abdominal discomfort, and passage of undigested food. *Sushruta Samhita Uttara Tantra* further elaborates on *Grahani Dosha* as a functional impairment of the intestinal holding capacity leading to *Ama* accumulation and chronic intestinal inflammation. The pathological triad of *Agnimandya-Ama-Srotodushti* in *Grahani Roga* strikingly parallels the pathophysiology of IBD, characterized by impaired digestive function, dysbiosis, barrier dysfunction, and chronic mucosal inflammation. *Ashtanga Hridaya* (Nidana Sthana 8) describes *Grahani* as dependent on *Agni* strength—when *Agni* weakens, *Grahani* loses its functional integrity, precipitating disease. This conceptual framework directly correlates with IBD's characteristic features: relapsing-remitting inflammatory diarrhea, malabsorption, immune dysregulation, and chronic intestinal damage. Thus, *Grahani Roga* provides a classical Ayurvedic framework for understanding and managing conditions akin to modern IBD through *Agni*-restoration therapies.

AGNIMANDYA AND *AMA*: AYURVEDIC PATHOGENESIS

Ama is defined as improperly digested or metabolized material produced due to weakened *Agni*. It is characterized by heaviness, stickiness, and obstructive properties, leading to *Srotodushti* (channel dysfunction). In modern terms, *Ama* may be correlated with toxic metabolites, microbial antigens, and inflammatory mediators that perpetuate immune activation in IBD.

MODERN PATHOPHYSIOLOGY OF IBD

a) IMMUNE DYSREGULATION AND CYTOKINE NETWORKS

IBD pathogenesis involves a dysfunctional immune response with the overactivation of pro-inflammatory mediators, such as TNF-α, IL-6, and IL-1β, which sustains mucosal inflammation and prevents immune resolution. This cytokine milieu drives leukocyte recruitment and tissue injury.[2]

b) Barrier Dysfunction and Microbiota

The gut microbiome profoundly influences intestinal immunity and barrier integrity. Dysbiosis, an imbalanced microbial community, is now considered central in IBD pathogenesis. Dysbiotic signatures correlate with decreased beneficial commensals and increased pro-inflammatory pathobionts, contributing to barrier breakdown and immune stimulation.[3]

Intestinal barrier proteins (e.g., occludin, ZO-1) are downregulated in IBD, increasing permeability and antigen translocation, and further amplifying inflammation.[4]

INTEGRATIVE CORRELATION: *AGNI* DYSFUNCTION AND IBD

AGNIMANDYA, DYSBIOSIS, AND IMMUNE ACTIVATION

Classical *Ayurveda* describes that impaired *Agni* leads to *Ama* formation and *Srotodushti*, a concept analogous to microbial dysbiosis and disrupted intestinal barrier function. Both models converge on the idea that impaired digestive transformation contributes to systemic inflammation. Recent reviews suggest that *Agni* corresponds functionally to digestive enzymes, microbial metabolism, and immunological homeostasis.

Reviews mapping *Agni* to the gut microbiome posit that microbial communities act as modern correlates of digestive fire, regulating nutrient metabolism, mucosal immunity, and systemic health, creating a conceptual bridge between paradigms.[5]

AYURVEDIC CONCEPT	MODERN BIOMEDICAL CORRELATE
Mandagni	Impaired digestion and metabolism
Ama	Inflammatory metabolites and antigens
Grahani Dusti	Small intestinal dysfunction
Srotodushti	Epithelial barrier breakdown
Atisara	Chronic diarrhea
Karshya	Cachexia and malnutrition

TABLE NO.1: COMPARATIVE ANALYSIS: *AYURVEDA* AND MODERN MEDICINE

EVIDENCE FOR *AYURVEDIC* AND HERBAL INTERVENTIONS IN IBD

1) Curcumin (Turmeric)

Curcumin has been extensively studied for its anti-inflammatory and antioxidant actions. Randomized clinical trials in ulcerative colitis patients demonstrate curcumin's ability to improve clinical remission and response, particularly as an adjunct to conventional therapy, with minimal adverse events.[6]

2) PLANT-DERIVED PHYTOCHEMICALS IN IBD

A comprehensive review of plant-derived natural products shows that several, including curcumin, *Boswellia serrata*, mastiha, and others, exert anti-inflammatory, microbiota-modulating, and immunomodulatory effects relevant to IBD. These agents impact NF-κB signaling, oxidative stress, and cytokine pathways implicated in disease pathogenesis.

3) *AYURVEDIC* HERBS AND EXPERIMENTAL MODELS

A scoping review of *Ayurvedic* herbs and formulations in IBD reports significant reductions in inflammatory markers (TNF-α, IL-2, PGE2), histological improvement, and symptom relief in preclinical and limited clinical contexts. Traditional polyherbal formulations (e.g., *Bilwa, Dhanyaka, Musta, Vala*) also show anti-inflammatory activity in animal models of experimental colitis.[7]

DISCUSSION: BRIDGING PARADIGMS AND LIMITATIONS

CONCEPTUAL STRENGTHS

- *Agni* provides a holistic etiology linking digestion, barriers, immunity, and systemic health.
- *Ayurvedic* herbs show multi-targeted effects on inflammation, oxidative stress, and microbial balance.
- Integrative models align *Agni* with gut microbial function and metabolic homeostasis, supportive of personalized approaches.

LIMITATIONS

- ✓ Standardization and quality control of herbal interventions vary.
- ✓ High-quality, double-blinded clinical trials are limited.
- ✓ Mechanistic translation from Ayurvedic constructs to molecular biology remains an active research need

FUTURE RESEARCH DIRECTIONS

- ➢ Correlative studies mapping *Agni* assessments with microbiome and immune biomarkers.
- ➢ Well-designed clinical trials assessing *Ayurvedic* protocols as a complementary therapy in IBD.
- ➢ Systems biology approaches integrating traditional diagnostics and contemporary data.

CONCLUSION

The *Ayurvedic* concept of *Agni* provides a comprehensive and systems-based framework that aligns closely with contemporary understanding of Inflammatory Bowel Disease (IBD) pathophysiology. Disturbances in

Agni (*Agnimandya*) lead to impaired digestion, formation of *Ama*, and dysfunction of gastrointestinal channels (*Srotodushti*), which conceptually parallel metabolic dysregulation, epithelial barrier impairment, immune activation, and microbial imbalance observed in IBD. These converging mechanisms highlight *Agni* as a foundational determinant of gut health and disease progression.

Emerging experimental and clinical evidence suggests that *Ayurvedic* herbal and integrative interventions targeting *Agni* possess anti-inflammatory, antioxidant, and immunomodulatory properties, with potential relevance to cytokine regulation, mucosal healing, and restoration of gut homeostasis. However, despite encouraging findings, the current body of evidence remains limited by heterogeneity in study design, lack of standardization, and insufficient large-scale randomized controlled trials.

REFERENCES

1) A Review of Ayurvedic Concepts of Agni and Their Correlation with Digestive and Metabolic Disorders. (2024). *African Journal of Biomedical Research*, *27*(3S), 6630-6634. https://doi.org/10.53555/AJBR.v27i3S.5635

2) Davila MM, Papada E. The Role of Plant-Derived Natural Products in the Management of Inflammatory Bowel Disease: What Is the Clinical Evidence So Far? Life (Basel). 2023 Aug 8;13(8):1703. doi: 10.3390/life13081703. PMID: 37629560; PMCID: PMC10455079.

3) Xiu Wang, Jianhua Peng, Peipei Cai, Yuxuan Xia, Chengxue Yi, Anquan Shang, Francis Atim Akanyibah, Fei Mao, The emerging role of the gut microbiota and its application in inflammatory bowel disease, Biomedicine & Pharmacotherapy, Volume 179, 2024,117302, ISSN 0753-3322, https://doi.org/10.1016/j.biopha.2024.117302.

4) https://doi.org/10.48550/arXiv.2510.04176

5) Exploring the Relationship Between Gut Microbiota and Agni: A Comprehensive Review. (2025). *Vascular and Endovascular Review*, *8*(3s), 71-77. https://verjournal.com/index.php/ver/article/view/288

6) Mohseni Saeid , Tavakoli Ali , Ghazipoor Hamid , Pouralimohamadi Neda , Zare Roghayeh , Rampp Thomas , Shayesteh Maryam , Pasalar Mehdi
Curcumin for the clinical treatment of inflammatory bowel diseases: a systematic review and meta-analysis of placebo-controlled randomized clinical trials, Volume 12 – 2025,10.3389/fnut.2025.1494351

7) Vakiti S, Farriss L, Mehta H, Madaram M, Ferrigno D, Shoukry R, Arango Hipsley J, Lee B, Atlas-Grayton L, Carlisano C, Petrosky SN. The Efficacy of Ayurvedic Herbs in the Prevention and Treatment of Inflammatory Bowel Disease: A Scoping Review. Cureus. 2025 May 19;17(5):e84410. doi: 10.7759/cureus.84410. PMID: 40535387; PMCID: PMC12176073.