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Gut health and skin health: the importance of supplementation, probiotics, and prebiotics in the prevention of acne and hyperpigmentation.

Gut Health and Skin Health: The Importance of Supplementation, Probiotics, and Prebiotics in Preventing Acne and Hyperpigmentation

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Summary

The relationship between gut health and skin health has been extensively investigated in recent decades, especially with advances in research on the human microbiome. The so-called gut-skin axis describes the bidirectional communication between the gastrointestinal system, the immune system, and the skin. Alterations in the gut microbiota, known as dysbiosis, can trigger systemic inflammatory processes that contribute to the development of various dermatological conditions, including acne, rosacea, atopic dermatitis, and skin hyperpigmentation.
In parallel, nutritional supplementation and the balance between probiotics and prebiotics have been studied as therapeutic strategies capable of modulating the gut microbiota and improving skin health. This article aims to review the scientific literature on the relationship between gut health and skin health, highlighting the role of vitamin supplementation, probiotics, and prebiotics in the prevention and treatment of aesthetic conditions such as acne and skin blemishes.
Analysis of available studies suggests that a balanced gut microbiota can reduce inflammatory processes, improve immune function, and contribute to healthier skin.
In conclusion, integrative approaches that consider gut health represent a promising strategy in the fields of aesthetics and dermatology.
Keywords: gut microbiota; probiotics; prebiotics; gut-skin axis; acne; hyperpigmentation.

Abstract

The relationship between gut health and skin health has been widely investigated in recent decades, especially with advances in research on the human microbiome. The so-called gut–skin axis describes the bidirectional communication between the gastrointestinal system, the immune system, and the skin. Alterations in the intestinal microbiota, known as dysbiosis, can trigger systemic inflammatory processes that contribute to the development of various dermatological conditions, including acne, rosacea, atopic dermatitis, and cutaneous hyperpigmentation. At the same time, nutritional supplementation and the balance between probiotics and prebiotics have been studied as therapeutic strategies to modulate the intestinal microbiota and improve skin health. This article aims to review the scientific literature on the relationship between gut health and skin health, highlighting the role of vitamin supplementation, probiotics, and prebiotics in the prevention and treatment of aesthetic conditions such as acne and skin discoloration. The analysis of available studies suggests that balancing the intestinal microbiota may reduce inflammation, improve immune function, and promote

healthier skin. It is concluded that integrative approaches that consider gut health represent a promising strategy in the field of aesthetics and dermatology.
Keywords: intestinal microbiota; probiotics; prebiotics; gut–skin axis; acne; hyperpigmentation.

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Introduction

The skin is the largest organ in the human body and plays fundamental roles in protection. against external agents, in thermoregulation and in maintaining homeostasis. Furthermore, the skin It directly reflects the internal health status of the organism.

In recent years, scientific research has shown that skin health is... deeply related to the balance of the gut microbiome. This phenomenon is known as The gut-skin axis, a complex communication system between the gastrointestinal tract, the system The immune system and the skin.

The gut microbiome is composed of trillions of microorganisms, including bacteria, fungi and viruses, which play essential roles in digestion, vitamin production, and in metabolism and in the regulation of the immune response. When this microbial balance is When disturbed, a condition known as intestinal dysbiosis occurs, characterized by a reduction in beneficial bacteria and an increase in potentially pathogenic microorganisms.

Gut dysbiosis can trigger systemic inflammation and increase permeability. This occurs in the intestines, allowing toxins and inflammatory metabolites to enter the bloodstream. The process can directly impact skin health, contributing to dermatological conditions. such as acne, dermatitis, rosacea, and hyperpigmentation.

In parallel, nutritional supplementation and the use of probiotics and prebiotics have been... investigated as therapeutic strategies capable of restoring the balance of the intestinal microbiota. and to improve skin health. Given this context, understanding the relationship between gut health is crucial. And skin health is becoming increasingly relevant in the field of integrative aesthetics.

Methodology

This study consists of a narrative review of the scientific literature on the relationship between the The gut microbiota and skin health. Scientific articles published between 2000 and 2010 were analyzed. 2024 in the following databases:

- PubMed
- SciELO
- Google Scholar
- ScienceDirect

The search terms included:

- gut skin axis

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- intestinal microbiota
- Probiotics and skin
- acne and gut health
- microbiome and dermatology

Articles were selected that addressed the relationship between the gut microbiota and the Nutritional supplementation and dermatological conditions.

Gut microbiota and body homeostasis

The human gut is home to approximately 100 trillion microorganisms, forming a A complex ecosystem that plays a fundamental role in maintaining health. Among the The main functions of the gut microbiota are:

- nutrient digestion
- vitamin production
- modulation of the immune system
- protection against pathogens
- metabolic regulation

A healthy gut microbiota is composed mainly of beneficial bacteria belonging to the genres:

- *Lactobacillus*
- *Bifidobacterium*
- *Faecalibacterium*

These microorganisms contribute to the integrity of the intestinal barrier and to the production of anti-inflammatory metabolites. When an imbalance occurs in the composition of these bacteria, it can Intestinal dysbiosis can occur, which is associated with various inflammatory diseases.

The gut-skin axis

The gut-skin axis refers to the interaction between the gut microbiome and the immune system. The immune system and the skin. Studies suggest that changes in the gut microbiota may influence directly affects skin physiology through various mechanisms.

Among the main mechanisms are:

1. Systemic inflammation

Gut dysbiosis can stimulate the production of inflammatory cytokines, such as:

- interleukin-6

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- tumor necrosis factor alpha
- interleukin-1 beta

These inflammatory substances can reach the skin through the bloodstream.
contributing to cutaneous inflammatory processes.

2. Intestinal permeability

Increased intestinal permeability, also known as *leaky gut,* allows...
Bacterial endotoxins enter the bloodstream. This phenomenon can trigger inflammation.
Systemic and exacerbate dermatological conditions.

3. Immune regulation

The gut microbiota plays a role in regulating the immune system. Changes in this
Imbalances can promote inflammatory reactions that directly affect the skin.

Relationship between gut dysbiosis and acne

Acne is a multifactorial dermatological condition characterized by inflammation of the...
pilosebaceous units. Several studies suggest that intestinal dysbiosis may contribute to
The development of acne occurs through inflammatory and metabolic mechanisms. Among the factors
Associated are:

- increased systemic inflammation
- hormonal changes
- increased sebum production
- exacerbated immune response

Furthermore, diets rich in ultra-processed foods with a high glycemic index can
It can promote an imbalance in the gut microbiota, worsening acne.

The relationship between gut health and hyperpigmentation.

Skin hyperpigmentation, including spots and melasma, can also be affected.
due to systemic inflammatory processes. Chronic inflammation can stimulate the activity of
melanocytes and increase melanin production.

When the gut has a microbial imbalance, there is an increase in the production of

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Inflammatory metabolites that can interfere with the regulation of skin pigmentation. Therefore, Strategies that promote the balance of the gut microbiota can indirectly contribute to The improvement of skin blemishes.

Probiotics and skin health

Probiotics are live microorganisms that, when consumed in adequate amounts, They provide health benefits. Several studies demonstrate that probiotics can:

- reduce inflammatory processes
- improve skin barrier function
- modulate the immune response
- Reduce acne lesions

Among the most studied bacterial strains are:

- *Lactobacillus rhamnosus*
- *Lactobacillus acidophilus*
- *Bifidobacterium bifidum*

These microorganisms help restore the balance of the gut microbiota.

Prebiotics and gut nutrition

Prebiotics are non-digestible food compounds that stimulate the growth of Beneficial bacteria in the gut. Among the main prebiotics are:

- inulin
- fructooligosaccharides
- galactooligosaccharides

Foods rich in prebiotics include:

- garlic
- onion
- banana
- oat
- chicory

These compounds promote the growth of beneficial bacteria and contribute to health. intestinal.

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Importance of nutritional supplementation

Vitamin supplementation also plays an important role in maintaining skin health. Among the most important nutrients are:

Vitamin A: participates in cell renewal and the regulation of sebum production.

Vitamin C: plays a role in collagen synthesis and has antioxidant properties.

Vitamin D - regulates immune function and may influence the gut microbiota.

Zinc - has anti-inflammatory properties and helps control acne.

Biotin - Contributes to the health of skin, hair and nails.

A deficiency in these nutrients can negatively affect both gut health and overall health. skin.

An integrative approach in aesthetics.

Modern aesthetics has increasingly adopted integrative approaches that consider the health of the organism as a whole. In addition to topical treatments and aesthetic procedures, it is It is important to consider internal factors such as:

- food
- gut health
- hormonal balance
- sleep quality
- stress management

This multidisciplinary approach can enhance aesthetic results and promote... longer-lasting benefits.

Final considerations

The relationship between gut health and skin health has been increasingly recognized by scientific literature. The gut-skin axis represents a complex communication system between the gut microbiome, the immune system, and the skin.

The balance of the gut microbiota plays a key role in regulating inflammation and the maintenance of the body's homeostasis. Alterations in this balance can contribute to the development of dermatological conditions such as acne and hyperpigmentation.

Nutritional supplementation, combined with the consumption of probiotics and prebiotics, can

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to represent an important complementary strategy for promoting skin health. Therefore,

Integrative approaches that consider gut health can contribute significantly to

More effective and sustainable aesthetic treatments.

Code of Ethics

This study is a literature review based on previously published scientific data, without involving human participants, clinical trials, or the collection of personally identifiable information. Therefore, it was not submitted to a Research Ethics Committee. All information used is publicly available and respects ethical principles and scientific integrity.

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