

Editorial Article

Gum-Gut Axis: Relationship Between Oral and Gut Microbiome

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Recent discoveries in microbiology are challenging the long-held view that oral health and gut health exist in separate domains. The «gum-gut axis» is a concept that describes a newly recognized, bidirectional relationship between the oral microbiome and the gut microbiome, revealing how conditions in one can have a profound impact on the other[1].

This growing body of evidence, bolstered by advances in sequencing technology and translational research, demands a fundamental shift in our approach to medicine and dentistry.

The traditional model of oral and gut bacteria being segregated by the digestive tract's harsh environment is no longer tenable[2]. It is now understood that oral bacteria can survive and travel to the gut, impacting the intestinal microbiome and vice versa, through several key pathways:

Enteric route: Pathogenic oral bacteria are swallowed daily, and some acid-tolerant species can survive and colonize the gut, particularly when the gut microbiota is already disrupted.

Hematogenous route: During inflammation, bacteria and their byproducts, such as endotoxins and inflammatory cytokines, can enter the bloodstream through the ulcerated tissue of periodontal pockets and travel to distant sites, including the gut.

Immune pathway: Immune cells in the oral cavity can become sensitized to specific oral pathogens. These "trained" immune cells may then migrate to the gut, where they can be activated by translocated oral bacteria, driving local inflammation.

The gum-to-gut connection: A trigger for systemic disease

The consequences of this crosstalk are significant and far-reaching. Oral dysbiosis, an imbalance in the oral microbiome, and specifically periodontal disease, is now implicated in numerous systemic pathologies[3].

Inflammatory bowel disease (IBD): Patients with periodontitis are several times more likely to also have

IBD, such as Crohn's disease or ulcerative colitis. Key oral pathogens, like *Porphyromonas gingivalis* and *Fusobacterium nucleatum*, can travel to the gut, trigger inflammatory immune responses, and exacerbate colitis in susceptible individuals.

Gastrointestinal cancers: Chronic oral inflammation and the transfer of dysbiotic oral bacteria have been linked to an increased risk of several gastrointestinal malignancies, including cancers of the esophagus, stomach, and colon.

Cardiometabolic diseases: Oral pathogens and the systemic inflammation they provoke have been linked to hypertension, diabetes, and atherosclerosis, highlighting a complex interplay with the oral-gut axis.

Unlocking a new era of healthcare

The discovery of the gum-gut axis forces us to reconsider the compartmentalized approach of modern medicine. It reveals that the health of the mouth and the health of the gut are intrinsically linked and that treating one without considering the other may provide only a partial solution.

A holistic perspective: Collaborative care between dentists and gastroenterologists is critical for developing holistic treatment plans. Managing periodontal disease could become a standard component of therapy for patients with chronic inflammatory gut conditions, and vice versa.

New diagnostic and therapeutic avenues: The search for non-invasive biomarkers in saliva to predict or monitor gut health is a promising area of research. Furthermore, strategies that modulate the microbiome, such as targeted probiotics, prebiotics, and dietary interventions, hold potential for new preventative and therapeutic approaches.

Prevention is paramount: The most powerful implication of the gum-gut axis is the validation of what we already know: good oral hygiene is a cornerstone of overall health. By keeping the oral microbiome in balance, we can reduce

the influx of harmful bacteria and inflammatory triggers into the gut, proactively preventing systemic disease.

The gut-to-gum feedback loop

The relationship is not one-sided. Conditions originating in the gut can also negatively influence the oral environment. An unhealthy gut can lead to systemic inflammation, which can, in turn, contribute to problems like gum disease. This creates a vicious, self-perpetuating cycle where inflammation and dysbiosis in one area reinforce the pathology in the other. Factors such as diet and stress, known disruptors of the gut microbiome, can alter the oral microbiome, making it more prone to pathogenic species.

In conclusion, the gum-gut axis is a powerful reminder that our bodies function as a single, interconnected ecosystem. Understanding this relationship is not merely an academic exercise; it represents a paradigm shift with the potential to revolutionize how we prevent, diagnose, and treat chronic inflammatory diseases, starting with the health of our mouth.

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