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THE ROLE OF PERIODONTAL PATHOGENS IN THE DEVELOPMENT OF PERIODONTITIS

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Abstract. Periodontitis is one of the most common inflammatory diseases of the periodontal tissues and a leading cause of tooth loss in adults. Periodontopathogenic microorganisms, which form a dysbiotic biofilm, play a key role in the initiation and progression of the disease. This paper reviews current concepts regarding the role of major periodontopathogens in the pathogenesis of periodontitis.

Keywords: periodontitis, periodontopathogens, biofilm, dysbiosis, *Porphyromonas gingivalis*, inflammation.

Relevance. Periodontitis is a chronic inflammatory disease characterized by the destruction of the tooth-supporting apparatus and alveolar bone resorption. Epidemiological studies indicate that the prevalence of the disease among the adult population reaches 50–70%. Microbial biofilm—containing specific periodontopathogens capable of inducing a pronounced inflammatory response in the host—is recognized as the primary etiological factor.

Objective. To analyze the role of key periodontopathogens in the development and progression of periodontitis based on current literature.

Materials and Methods. An analysis was conducted of domestic and international scientific publications indexed in eLIBRARY, PubMed, and Scopus databases, focusing on the microbiological profile of periodontitis and the pathogenicity mechanisms of the primary microorganisms involved.

Results and Discussion. It has been established that the development of periodontitis is associated with the formation of a dysbiotic subgingival biofilm dominated by members of the so-called "red complex": *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Treponema denticola*. *Porphyromonas gingivalis* is considered a "keystone pathogen" capable of modifying the host immune response, disrupting the balance of the microbial community, and activating the production of pro-inflammatory cytokines (IL-1β, TNF-α, IL-6). Its virulence factors (gingipains, lipopolysaccharide, fimbriae) contribute to the destruction of connective tissue and the stimulation of osteoclastogenesis.

Tannerella forsythia exhibits pronounced proteolytic activity and exacerbates the inflammatory process. *Treponema denticola* is characterized by high motility and invasiveness, facilitating the penetration of the infection into deep periodontal tissues.

Thus, the pathogenesis of periodontitis is driven not only by the microbial factor but also by the characteristics of the host immune response, confirming the concept of dysbiosis as the primary mechanism of the disease.

Conclusions

1. Periodontopathogens are a key etiological factor in the development of periodontitis.
2. Microorganisms of the "red complex" are of the greatest significance.
3. Periodontitis develops as a result of dysbiotic changes in the microbial biofilm and a pathological host immune-inflammatory response.

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4. Understanding the mechanisms of pathogenicity opens up prospects for developing targeted prevention and treatment methods.

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