



Exploring the Interconnected Role of the Oral Microbiome and Periodontal Disease in the Development and Progression of Oral Squamous Cell Carcinoma

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Introduction

Oral squamous cell carcinoma (OSCC) is a significant challenge in cancer care, with survival rates remaining low despite treatment advancements. Recently, researchers have turned their focus to the oral microbiome and periodontal disease, exploring their role in OSCC development and progression. This emerging field sheds light on how changes in oral bacteria and gum health may contribute to the formation and spread of OSCC. By understanding these connections, we aim to uncover new ways to diagnose and treat this complex disease more effectively.

Data Sources

Literature was searched electronically from PubMed and ScienceDirect published between 2020 and 2024 using the keywords "oral microbiota," "oral cancer," "oral squamous cell carcinoma," and "periodontitis." The titles and abstracts of the located papers were thoroughly examined to determine their eligibility for inclusion or exclusion in the review. 25 articles were searched.

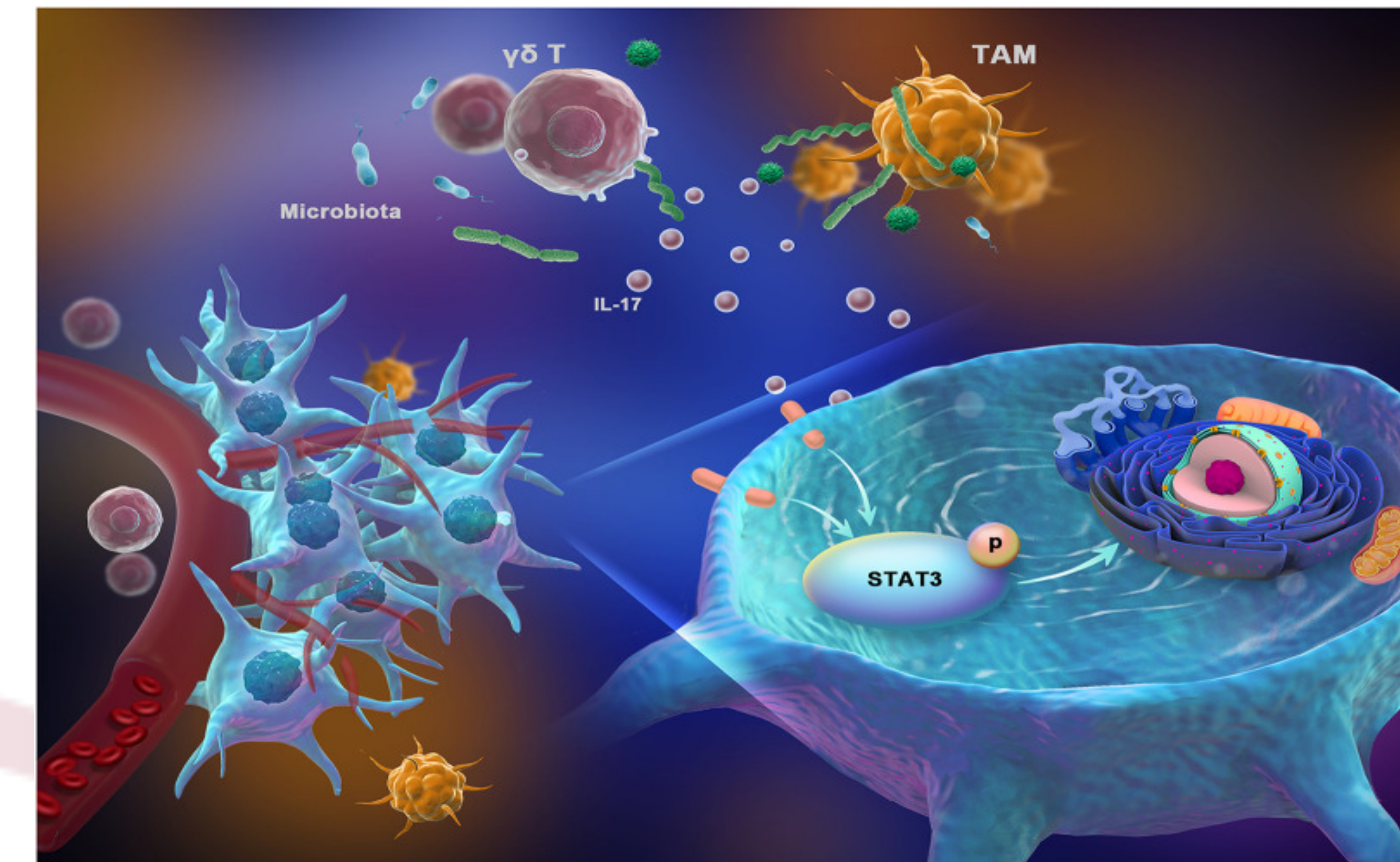


Fig. 1: Proposed diagram. The immune response linked to tumors may be influenced by oral microbiota originating from periodontal disease. These oral bacteria stimulate the activation of IL-17+ $\gamma\delta$ T cells, potentially enhancing tumor growth.

Inclusion and Exclusion Criteria

	Inclusions	Exclusions
Time Period	Literature published the year of 2020 till current date	Literature published before the year 2020
Language	English	Non-English
Article Type	Peer-review	Review Articles
Article Criteria	Oral microbiome, periodontitis, and oral cancer	Oral microbiome, periodontitis, and other cancers

Results

Complexity of Oral Microbiota and Dysbiosis: 9 articles

Oral microbiota's diverse composition and delicate balance are pivotal for oral health. Dysbiosis increases periodontitis-associated pathogens like *Fusobacterium nucleatum*, while decreasing beneficial bacteria.

Inflammatory Response and Cancer Progression: 6 articles

Dysbiosis-driven chronic inflammation significantly promotes OSCC initiation, growth, and metastasis. Periodontitis-associated bacteria enhance cancer cell proliferation, migration, invasion, and pro-inflammatory cytokine production.

Immune System Interactions: 5 articles

Interaction between dysbiosis and the host immune system, especially $\gamma\delta$ T cells and the IL-17/STAT3 pathway, plays a pivotal role in OSCC development. Dysbiosis-induced alterations in immune cell function and cytokine production contribute to tumor progression.

Conclusions and Future Directions

- Dysbiosis in the oral microbiota is crucial for oral cancer development, linked to immune system interactions.
- Treatments targeting dysbiosis and inflammation hold promise for preventing and treating oral cancer.
- Future research should focus on understanding the mechanisms behind dysbiosis and inflammation in oral cancer, for better treatment options.
- Identifying specific bacteria linked to oral cancer could lead to better diagnostic tests.
- More studies are needed to understand how targeting the oral microbiota could help manage oral cancer.

References and Acknowledgements

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