Immunotherapy in oral cancer: Harnessing the immune system for targeted treatment.

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Introduction

Oral cancer is a significant health concern, with high morbidity and mortality rates. Traditional treatment modalities such as surgery, radiation, and chemotherapy have been the mainstay of management. However, immunotherapy has emerged as a promising approach in the field of oncology, including oral cancer. By leveraging the body's immune system, immunotherapy offers targeted and potentially more effective treatment options. This article explores the role of immunotherapy in oral cancer, highlighting its mechanisms of action, current therapeutic approaches, and future directions.

Immunotherapy utilizes the body's immune system to recognize and eliminate cancer cells. The immune system is equipped with various components, including T cells, B cells, natural killer cells, and antigen-presenting cells, which work together to detect and destroy abnormal cells, including cancerous ones. However, cancer cells can evade immune surveillance through various mechanisms, leading to disease progression. Immunotherapy aims to overcome these immune evasion tactics and enhance the body's natural ability to target cancer cells.

One of the most successful approaches in immunotherapy is immune checkpoint inhibitors. These inhibitors target proteins, such as programmed cell death protein 1 (PD-1) and its ligand (PD-L1), or cytotoxic T-lymphocyte-associated protein 4 (CTLA-4), which downregulate the immune response. By blocking these checkpoint proteins, immune checkpoint inhibitors restore the immune system's ability to recognize and attack cancer cells. Clinical trials have demonstrated impressive responses in various cancers, including oral cancer, leading to FDA approval of immune checkpoint inhibitors for certain indications.

Another form of immunotherapy is adoptive cell transfer (ACT) therapy. ACT involves collecting and expanding a patient's own immune cells, such as tumor-infiltrating lymphocytes (TILs) or genetically modified T cells, in the laboratory. These activated cells are then infused back into the patient, where they recognize and destroy cancer cells more effectively. ACT therapy holds promise for treating advanced oral cancer and has shown encouraging results in clinical trials.

Vaccines and oncolytic viruses represent additional avenues of immunotherapy in oral cancer. Cancer vaccines stimulate the immune system to recognize and attack cancer cells by presenting tumor-specific antigens. Oncolytic viruses, on the other hand, are designed to selectively infect and destroy cancer cells while stimulating an immune response against the tumor. Both approaches aim to enhance the immune system's ability to target oral cancer cells and prevent disease recurrence.

The future of immunotherapy in oral cancer lies in combination approaches. Combining different immunotherapies, such as immune checkpoint inhibitors with ACT therapy or vaccines, has shown promise in enhancing response rates and improving patient outcomes. Additionally, understanding the tumor microenvironment and the interplay between cancer cells and the immune system will help identify novel therapeutic targets and develop personalized immunotherapeutic strategies.

Conclusion

Immunotherapy has revolutionized the treatment landscape for various cancers, including oral cancer. By harnessing the power of the immune system, immunotherapeutic approaches, such as immune checkpoint inhibitors, ACT therapy, vaccines, and oncolytic viruses, offer new opportunities for targeted and effective treatment. While immunotherapy has shown promising results, further research is needed to optimize treatment protocols, identify predictive biomarkers, and develop combination strategies. Through ongoing research and clinical trials, immunotherapy has the potential to significantly improve outcomes for patients with oral cancer, providing hope for a brighter future in cancer treatment.

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***Received:** 30-Jun-2023, Manuscript No.AABPS-107570; **Editor assigned:** 05- Jul -2023, PreQC No.AABPS -23-107570(PQ); **Reviewed:** 20- Jul-2023, QC No.AABPS-23-107570; **Revised:** 24- Jul-2023, Manuscript No. AABPS-23-107570(R); **Published:** 31- Jul-2023, DOI: 10.35841/aabps-13.100.189*

***Citation:** Ling P. Immunotherapy in oral cancer: Harnessing the immune system for targeted treatment. Asian J Biomed Pharmaceut Sci. 2023;13(100):189*

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Citation: *Ling P. Immunotherapy in oral cancer: Harnessing the immune system for targeted treatment. Asian J Biomed Pharmaceut Sci. 2023;13(100):189*