Combining immunotherapy with traditional cancer treatments: A synergistic approach.

Coen Velec*

Department of Dermatology, Amsterdam University Medical Centers (UMC), Netherlands

Introduction

Cancer remains a leading cause of mortality worldwide, prompting the need for innovative treatment strategies. Traditional cancer therapies, including surgery, chemotherapy, and radiotherapy, have been the mainstay of cancer treatment for decades. However, the advent of immunotherapy has revolutionized cancer treatment, offering the potential for durable responses and improved survival rates. Combining immunotherapy with traditional cancer treatments is emerging as a promising strategy to enhance treatment efficacy and overcome resistance mechanisms. This article explores the rationale behind this synergistic approach, highlights key findings from recent studies, and discusses potential challenges and future directions [1].

Traditional cancer treatments primarily target tumor cells through cytotoxic mechanisms. Chemotherapy and radiation therapy work by damaging DNA and inducing apoptosis in rapidly dividing cells, including cancer cells. However, these treatments can also induce immunogenic cell death, releasing tumor antigens and activating the immune system. This creates an opportunity to combine these approaches with immunotherapy, which aims to enhance the immune system's ability to recognize and attack cancer cells [2].

Ongoing clinical trials evaluating combination strategies will provide valuable insights into the safety and efficacy of these approaches, guiding future treatment paradigms. Many tumors develop resistance to both traditional and immunotherapeutic approaches. Resistance to immunotherapy, particularly immune checkpoint inhibitors, can occur due to a lack of sufficient T cell activation or inadequate antigen presentation. Combining immunotherapy with traditional treatments can enhance antigen release and promote a more robust immune response, thereby overcoming these resistance mechanisms [3].

The tumor microenvironment (TME) plays a crucial role in shaping the efficacy of cancer therapies. Traditional treatments can alter the TME by reducing tumor burden and modifying the immune landscape, potentially making it more favorable for immunotherapy. For instance, chemotherapy can decrease the number of immunosuppressive cells, such as regulatory T cells and myeloid-derived suppressor cells, thereby enhancing the efficacy of subsequent immunotherapy [4].

Identifying reliable biomarkers that can predict response to combination therapies will be crucial for personalized treatment approaches. Studies have demonstrated that combining immunotherapy with chemotherapy can enhance treatment outcomes in various cancers. For instance, the combination of pembrolizumab, an anti-PD-1 antibody, with chemotherapy showed improved survival rates in patients with non-small cell lung cancer (NSCLC) compared to chemotherapy alone. Similarly, in triple-negative breast cancer, the addition of atezolizumab, an anti-PD-L1 agent, to chemotherapy improved progression-free survival [5].

Radiotherapy can act as an immunogenic treatment by inducing the release of tumor antigens and promoting T cell infiltration into the tumor. Studies have shown that combining radiation with immune checkpoint inhibitors can lead to enhanced anti-tumor responses. For example, in melanoma patients, the combination of stereotactic body radiotherapy (SBRT) and anti-PD-1 therapy demonstrated improved response rates compared to either treatment alone [6].

Combining immunotherapy with targeted therapies is another promising approach. For instance, the combination of anti-PD-1 therapy with targeted therapies such as BRAF and MEK inhibitors in BRAF-mutant melanoma has shown promising results, leading to improved response rates and durability. This combination leverages the benefits of targeted therapy to reduce tumor burden while enhancing immune recognition through immunotherapy [7].

While combining immunotherapy with traditional treatments can enhance efficacy, it may also increase the risk of immune-related adverse events (irAEs). These adverse effects can arise from an overactive immune response, leading to autoimmunity and other complications. Careful monitoring and management of irAEs are essential when implementing combination strategies [8].

Further research into the underlying mechanisms of synergy between immunotherapy and traditional treatments will enhance our understanding of how to optimize combination strategies The timing and sequence of administering traditional treatments and immunotherapy can significantly impact treatment outcomes. Optimal scheduling must be carefully considered to maximize synergy while minimizing potential negative interactions. Ongoing clinical trials are investigating various treatment sequences to determine the most effective strategies [9].

Continued exploration of novel combinations of immunotherapy with traditional treatments, as well as other

***Correspondence to:** Coen Velec, Department of Dermatology, Amsterdam University Medical Centers (UMC), Netherlands. E-mail: Coen.ve@cze.nl

***Received:** 27-Sep-2024, Manuscript No. AAJCIT-24-150274; **Editor assigned:** 28-Sep-2024, Pre QC No. AAJCIT-24-150274(PQ); **Reviewed:** 14-Oct-2024, QC No AAJCIT-24-150274; **Revised:** 19-Sep-2024, Manuscript No. AAJCIT-24-150274(R); **Published:** 28-Sep-2024, DOI:10.35841/aajcit-7.5.234*

***Citation:** Velec C., Combining immunotherapy with traditional cancer treatments: A synergistic approach. J Cancer Immunol Ther. 2024;7(5):234*

emerging therapies, is essential for maximizing patient benefit. Not all patients may benefit equally from combination therapies. Biomarkers that predict response to immunotherapy, such as PD-L1 expression and tumor mutational burden, can help identify patients who are most likely to benefit from these approaches. Personalized treatment plans based on individual patient characteristics and tumor profiles will be critical in optimizing outcomes [10].

Conclusion

Combining immunotherapy with traditional cancer treatments represents a synergistic approach that has the potential to enhance treatment efficacy and overcome resistance mechanisms. By leveraging the complementary mechanisms of action and altering the tumor microenvironment, this strategy may lead to improved outcomes for cancer patients. As research in this area continues to advance, personalized combination therapies may become a cornerstone of cancer treatment, offering hope for better survival rates and quality of life.

References

1. Dummer R, Ascierto PA, Nathan P, Robert C, Schadendorf D. Rationale for immune checkpoint inhibitors plus targeted therapy in metastatic melanoma: a review. JAMA Oncol. 2020;6(12):1957-66. Google Scholar
2. Foulkes WD, Smith IE, Reis-Filho JS. Triple-negative breast cancer. N Eng J Med. 2010;363(20):1938-48. Google Scholar
3. Hernández ÁP, Juanes-Velasco P, Landeira-Viñuela A, Bareke H, Montalvillo E, Góngora R, Fuentes M. Restoring the immunity in the tumor microenvironment: Insights into immunogenic cell death in onco-therapies. Cancers. 2021;13(11):2821. Google Scholar
4. Gandhi, L., et al., Pembrolizumab plus chemotherapy in metastatic non-small-cell lung cancer. N Eng J Med. 2018;378(22), 2078-2092.Google Scholar
5. Pabst L, Lopes S, Bertrand B, Creusot Q, Kotovskaya M, Pencreach E, Beau-Faller M, Mascaux C. Prognostic and predictive biomarkers in the era of immunotherapy for lung cancer. Int J Mol Sci. 2023;24(8):7577. Google Scholar
6. Sankar K, Ye JC, Li Z, Zheng L, Song W, Hu-Lieskovan S. The role of biomarkers in personalized immunotherapy. Biomark Res. 2022;10(1):32. Google Scholar
7. Du Y, Rong L, Cong Y, Shen L, Zhang N, Wang B. Macrophage polarization: an effective approach to targeted therapy of inflammatory bowel disease. Expert Opin Ther Targets. 2021;25(3):191-209. Google Scholar
8. Ziemkiewicz N, Hilliard G, Pullen NA, Garg K. The role of innate and adaptive immune cells in skeletal muscle regeneration. Int J Mol Sci. 2021;22(6):3265. Google Scholar
9. Nebhan CA, Johnson DB. Predictive biomarkers of response to immune checkpoint inhibitors in melanoma. Expert Rev Anticancer Ther. 2020;20(2):137-45. Google Scholar
10. Guennoun A, Sidahmed H, Maccalli C, Seliger B, Marincola FM, Bedognetti D. Harnessing the immune system for the treatment of melanoma: current status and future prospects. Expert Rev Clin Immunol. 2016;12(8):879-93.

Citation: *Velec C., Combining immunotherapy with traditional cancer treatments: A synergistic approach. J Cancer Immunol Ther. 2024;7(5):234*