



Combinational cancer immunotherapy: Allergy-assisted immunotherapy and immune checkpoint inhibitors

Michael John Dochniak *

Alleamit Corporation (Alleamit.com), Minnesota, and the United States of America.

GSC Biological and Pharmaceutical Sciences, 2025, 31(01), 131-133

Publication history: Received on 18 February 2025; revised on 13 April 2025; accepted on 15 April 2025

Article DOI: <https://doi.org/10.30574/gscbps.2025.31.1.0154>

Abstract

Allergy-assisted cancer immunotherapy is an innovative approach that leverages the body's natural immune response to allergies. This approach potentially enhances the effectiveness of cancer immunotherapy by stimulating the immune system and improving its ability to inhibit malignant tumors. This review discusses combinational therapy wherein immune checkpoint inhibitors (i.e., immunologic adjuvants) are part of allergy-assisted cancer immunotherapy.

Keywords: Allergy; Cancer; Checkpoint Inhibitors; Combinational Immunotherapy; Regulatory T Cells

1. Introduction

The immune system has evolved to defend the body against harmful invaders, although it can overreact to harmless substances like allergens. When the immune system identifies a harmless substance as a threat, it produces allergen-specific IgE antibodies, a crucial aspect of the allergy cascade. (1) Common allergy symptoms include sneezing, runny or stuffy nose, itchy eyes, skin rash or hives, and potentially wheezing, coughing, or difficulty breathing. In rare cases, a severe allergic reaction called anaphylaxis can occur, which can be life-threatening. (2)

Most importantly, the allergy cascade may have a beneficial effect, such as anti-cancer properties. (3) Studies indicate that less than 30% of U.S. adults and children have at least one allergy. (4) Advances in *in-vivo* allergen-specific IgE production (e.g., U.S. Patent 11,911,463) may support the allergy cascade to reduce the incidence and prevalence of malignant tumors. (5)

Immune checkpoint inhibitors (6) may function as immunologic adjuvants to stimulate the allergy response in cancer patients. They disrupt the normal regulation of the immune system, leading to a heightened response to allergens. Immune checkpoint inhibitors reduce regulatory T cells (Tregs) to stimulate and preserve allergies. (7,8,9)

2. Discussion

2.1. Combinational Cancer Immunotherapy

In cancer immunotherapy, immune checkpoint inhibitors are laboratory-made monoclonal antibodies that block specific proteins associated with cancer cells or immune cells. The blocked proteins stimulate activated T lymphocytes to attack cancer cells more effectively. (10) A side effect of immune checkpoint inhibitor treatment is reduced regulatory T cells (Tregs) and increased allergies. (11) Tregs are a specialized subset of CD4⁺ T cells that can impede the allergy cascade. (12) Immune checkpoint inhibitors as an immunologic adjuvant in hyper-allergenic skin creams may provide a constructive collaboration to enhance cancer immunotherapy. (13)

* Corresponding author: Michael John Dochniak

2.2. Safety Considerations

Immune checkpoint inhibitors may show promise as immunologic adjuvants in allergy-assisted cancer immunotherapy, but their integration requires careful consideration of safety and efficacy. To prevent overwhelming immune activation (14), immune checkpoint inhibitors can be administered at a lower dose. It is essential to inhibit the tumor microenvironment while minimizing potentially harmful toxicity associated with ICI-related adverse events (15) and systemic inflammation from the allergy cascade. (16)

2.3. Challenges

Immune checkpoint inhibitors are typically administered intravenously as an infusion into a vein or subcutaneously. (17,18) Incorporating them into a topical skin cream raises concerns about dermal absorption, as these checkpoint inhibitors are large-molecule monoclonal antibodies. Topical administration is unconventional, given that the skin may serve as a barrier to their absorption. (19).

3. Conclusion

Ongoing research is focused on combination cancer immunotherapy to enhance treatment efficacy. Combining immune checkpoint inhibitors with allergy-assisted cancer therapy could improve immune specificity and help inhibit the tumor microenvironment. However, rigorous clinical validation is necessary to assess both safety and the potential benefits of such combinations.

Compliance with ethical standards

Acknowledgments

Michael John Dochniak of Alleamit Corporation (Alleamit.com), Minnesota, and the United States of America.

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Author Profile

Michael John Dochniak has authored several books on Alzheimer's disease, Artificial Intelligence, Autism Spectrum Disorders, and Climate Change through Cambridge Scholars Publishing and Nova Science Publishers.

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