Mini Review
Volume 12:3, 2023

Journal of Integrative Oncology

ISSN: 2329-6771 Open Access

Immunotherapy in Cellular Oncology: Harnessing the Immune System to Fight Cancer

Suie Levi*

Department of Medicine, Iran National Standard Organization, Tehran, Iran

Abstract

Immunotherapy is a revolutionary approach to cancer treatment that harnesses the body's own immune system to recognize, attack, and destroy cancer cells. Unlike traditional cancer treatments such as chemotherapy and radiation therapy, which directly target cancer cells, immunotherapy works by stimulating or enhancing the body's natural immune response against cancer. The immune system is a complex network of cells, tissues, and organs that defends the body against infections and diseases, including cancer. However, cancer cells can sometimes evade detection by the immune system. ver the years, various immunotherapies have been developed and approved for the treatment of different types of cancer. Some of the most notable ones include pembrolizumab and nivolumab (checkpoint inhibitors), as well as CAR T-cell therapies like Kymriah and Yescarta. Immunotherapy has shown remarkable success in treating some types of cancer, leading to long-lasting remissions or even cures in certain patients. It has particularly been effective in melanoma, lung cancer, and some forms of leukemia and lymphoma.

Keywords: Cancer • Cellular oncology • Immunotherapy

Introduction

Researchers are exploring the potential of combining immunotherapy with other treatments like chemotherapy, radiation therapy, and targeted therapy to enhance its effectiveness. While immunotherapy has been a game-changer in cancer treatment, it doesn't work for all patients or all types of cancer. Additionally, it can sometimes cause immune-related side effects that require management. On-going research in immunotherapy aims to expand its applicability to more cancer types, improve response rates, reduce side effects, and better understand the mechanisms involved in immune response to cancer. Immunotherapy represents a significant advancement in cancer treatment, and it has provided new hope for patients with previously untreatable or advanced cancers. It continues to be an active and promising area of cancer research and treatment development. Specific allergen injection immunotherapy is highly effective in treating IgE-mediated diseases. IgE-mediated diseases are conditions in which the immune system responds to allergens by producing IgE antibodies, leading to allergic reactions [1-3].

Literature Review

This therapy is particularly successful in managing conditions like allergic rhinitis (hay fever) and venom anaphylaxis (severe allergic reactions to insect stings or bites). Immunotherapy is effective in inhibiting both the early and late responses to allergen exposure. In allergic reactions, the early response involves the release of histamine and other mediators, leading to immediate symptoms like itching and swelling. The late response occurs hours later and is associated with more sustained symptoms. Immunotherapy helps mitigate both of these responses. During specific allergen injection immunotherapy, there is an increase in allergen-specific IgG antibodies, particularly the IgG4 isotype. IgG4 antibodies play a critical role in blocking allergic reactions. They are involved in inhibiting IgE-dependent histamine release from basophils (a type of white blood cell) and also interfere with IgE-mediated antigen presentation to T cells. Immunotherapy acts on T cells to modify peripheral and mucosal TH2 responses to allergen in favour of TH1 responses. Recent studies have identified increased IL-10 production in peripheral blood and mucosal surfaces after immunotherapy. IL-10 has numerous potential antiallergic properties, including suppression of mast cell, eosinophil, and T-cell responses, as well as acting on B cells to favour heavy chain class switching to IgG4 [4].

Immunotherapy with inhalant allergens associated with serum allergen

Conventional pollen immunotherapy, which is used to desensitize individuals to pollen allergens, typically does not result in significant changes in serum IgE concentrations. Serum IgE is the type of antibody associated with allergic reactions. Blunted Seasonal Increases in IgE: While pollen allergens can trigger seasonal increases in IgE levels in allergic individuals, conventional immunotherapy tends to dampen or blunt these seasonal increases. In other words, the therapy helps reduce the severity of allergic reactions during the pollen season. Potential Emergence of Novel IgE Responses: One possible adverse effect of immunotherapy is the development of new IgE responses to allergenic components of the pollen extract used for treatment. In other words, individuals undergoing immunotherapy may develop IgE antibodies against allergens they were not previously allergic to Immunotherapy with inhalant allergens is associated with increases in serum allergen-specific IgG1, IgG4, and IgA levels.12. The central role of T cells in directing allergic responses has generated a number of hypotheses regarding their role in immunotherapy. Investigations have addressed mechanisms such as immune deviation away from a TH2 phenotype toward a more non-pathogenic TH1 phenotype, inhibition of antigen presentation to allergen-specific T cells, and, more recently, suppression of responses by T cells with regulatory activity [5,6].

Discussion

Active immunotherapy has demonstrated effectiveness against agents that typically cause acute, self-limiting infectious diseases followed by the development of immunity. In such cases, the immune system can effectively target and eliminate the infectious agent, leading to lasting protection. In contrast, active immunotherapy for chronic infectious diseases or cancer faces unique challenges. Chronic diseases often involve persistent infections or cancerous cells that can evade the immune system, making it difficult for the immune response to control or eliminate them. Effective immunotherapy for chronic diseases requires the identification and selection of appropriate target antigens. These antigens are specific molecules or proteins present on the surface of infectious agents

***Address for Correspondence:** Suie Levi, Department of Medicine, Iran National Standard Organization, Tehran, Iran, E-mail: ;levi@yahoo.com*

Received: 27 April, 2023, Manuscript No. Jio-23-112989; **Editor assigned**: 29 April, 2023, Pre QC No. P-112989; **Reviewed:** 12 May, 2023, QC No. Q-112989; **Revised:** 19 May, 2023, Manuscript No. R-112989; **Published:** 24 May, 2023, DOI: 10.37421/2329-6771.2023.12.432

or cancer cells that can be recognized by the immune system. Selecting the right antigens is crucial for the success of the therapy. Another important aspect of effective immunotherapy is optimizing the interaction between the antigenic peptide (part of the target antigen), Antigen-Presenting Cells (APCs), and T cells. This interaction is essential for the activation of T cells, which play a central role in immune responses.

Conclusion

In summary, active immunotherapy has been successful in certain contexts, particularly for acute infectious diseases. However, applying immunotherapy to chronic infectious diseases and cancer requires careful consideration of target antigens, optimization of immune responses, and overcoming inhibitory mechanisms. Research in these areas aims to develop more effective and targeted immunotherapies for chronic diseases, where the immune system faces greater challenges in mounting a successful response. This process can lead to changes in the immune response, including the production of allergen-specific IgG antibodies that help mitigate allergic reactions. However, as mentioned in the passage, the development of new IgE responses to other allergenic components is a potential concern, and further research is needed to better understand its implications for clinical outcomes.

Acknowledgement

We thank the anonymous reviewers for their constructive criticisms of the manuscript. The support from ROMA (Research Optimization and recovery in the Manufacturing industry), of the Research Council of Norway is highly appreciated by the authors.

Conflict of Interest

None.

References

1. Fukumura, Dai, Jonas Kloepper, Zohreh Amoozgar and Dan G. Duda, et al. "Enhancing cancer immunotherapy using antiangiogenics: Opportunities and challenges." *Nat Rev Clin Oncol* 15 (2018): 325-340.
2. Esfahani, K., L. Roudaia, N. A. Buhlaiga and S. V. Del Rincon, et al. "A review of cancer immunotherapy: From the past, to the present, to the future." *Curr Oncol* 27 (2020): 87-97.
3. Steinman, Ralph M. and Ira Mellman. "Immunotherapy: bewitched, bothered, and bewildered no more." *Sci* 305 (2004): 197-200.
4. Martin, John D., Horacio Cabral, Triantafyllos Stylianopoulos and Rakesh K. Jain. "Improving cancer immunotherapy using nanomedicines: Progress, opportunities and challenges." *Nat Rev Clin Oncol* 17 (2020): 251-266.
5. Rosenberg, Steven A. "Progress in human tumour immunology and immunotherapy." *Nature* 411 (2001): 380-384.
6. Kirschner, Denise and John Carl Panetta. "Modeling immunotherapy of the tumor–immune interaction." *J Math Biol* 37 (1998): 235-252.

How to cite this article: Levi, Suie. "Immunotherapy in Cellular Oncology: Harnessing the Immune System to Fight Cancer." *J Integr Oncol* 12 (2023): 432