

Neoantigen Targeted Vaccine and Its Role in Cancer Cells

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DESCRIPTION

Cancer is one of the dangerous diseases, and its incidence has been increasing globally. The traditional approach to treat cancer involves surgery, chemotherapy, and radiation therapy. However, these treatments often result in severe side effects and are not effective for all patients. In recent years, immunotherapy has emerged as a promising approach to treating cancer. One of the most promising immunotherapy strategies is the development of neoantigen-targeted vaccines. In this article, we will discuss the concept of neoantigens, their role in cancer, and the development of neoantigen-targeted vaccines.

Neoantigens are newly formed proteins that arise from somatic mutations in cancer cells. These mutations create abnormal proteins that are not present in normal cells. These abnormal proteins are recognized as foreign by the immune system and activate an immune response. The presence of neoantigens in cancer cells provides an opportunity to develop cancer-specific immunotherapies that target these abnormal proteins while sparing normal cells.

Role of neoantigens in cancer

Neoantigens play a crucial role in cancer progression and immune evasion. Cancer cells acquire mutations that enable them to evade the immune system's surveillance and proliferate uncontrollably. Neoantigens are formed as a result of these mutations and provide the immune system with a target to attack cancer cells. However, cancer cells can also evolve mechanisms to escape immune recognition by downregulating the expression of neoantigens or upregulating immune checkpoint proteins. This immune evasion allows cancer cells to continue to grow and spread throughout the body.

Development of neoantigen-targeted vaccines

The development of neoantigen-targeted vaccines involves identifying neoantigens that are specific to a patient's tumor and

formulating a vaccine that can elicit an immune response against these neoantigens. The process of identifying neoantigens involves analyzing the tumor's genetic makeup and identifying somatic mutations that result in the formation of abnormal proteins. These abnormal proteins are then screened to determine their potential to elicit an immune response.

Once neoantigens have been identified, a personalized vaccine is formulated that contains a mixture of neoantigen peptides that are specific to the patient's tumor. The vaccine is designed to elicit a T cell response against the neoantigens and generate memory T cells that can recognize and attack the cancer cells that express these neoantigens.

The efficacy of neoantigen-targeted vaccines has been demonstrated in preclinical studies and early-phase clinical trials. In a study published in *Nature*, researchers tested a personalized neoantigen vaccine in patients with melanoma. The vaccine was well-tolerated and generated a T cell response against the neoantigens. In addition, patients who received the vaccine had improved progression-free survival compared to those who did not receive the vaccine.

CONCLUSION

Neoantigen-targeted vaccines are a promising approach to treating cancer. These vaccines are personalized and designed to elicit a T cell response against the neoantigens expressed by a patient's tumor. The development of neoantigen-targeted vaccines requires the identification of neoantigens that are specific to a patient's tumor. Once identified, a personalized vaccine is formulated that contains a mixture of neoantigen peptides that are specific to the patient's tumor. While neoantigen-targeted vaccines are still in the early stages of development, the results from preclinical studies and early-phase clinical trials are encouraging and suggest that these vaccines have the potential to become a powerful tool in the fight against cancer.

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