Neoantigen

Neoantigens, short for “neoantigenic peptides” or “neoepitopes,” are newly formed antigens or protein fragments that result from somatic mutations within an individual's body. These mutations can occur in cancer cells or other diseased cells and give rise to unique and previously non-existent antigens.

What Are Neoantigens?

- **Neoantigens** are **non-self peptides** arising from somatic mutations in tumor cells.
- They are **absent from normal tissues**, making them ideal targets for immunotherapy.
- Personalized vaccines are developed by sequencing a patient’s tumor and identifying immunogenic neoantigens.

Key characteristics and features of neoantigens include:

Somatic Mutations: Neoantigens are the product of somatic mutations, which are genetic changes that occur in non-reproductive cells during a person's lifetime. These mutations can lead to the creation of neoantigens.

Cancer-Specific: In the context of cancer, neoantigens are typically found on the surface of cancer cells. They are distinct from the antigens present in normal, healthy cells.

Immune Response: Neoantigens can trigger an immune response when they are recognized as foreign by the immune system. This immune response can involve the activation of T cells and other immune cells to target and destroy cells containing neoantigens.

Heterogeneity: Neoantigens can be highly variable among different individuals and even among different cancer cells within the same individual. This heterogeneity makes them attractive targets for personalized medicine and cancer immunotherapy.

Personalization: Neoantigens are often unique to an individual's disease, making them suitable for personalized treatment approaches. Personalized neoantigen-based vaccines can be designed to specifically target the neoantigens present in a patient's cancer cells.

Potential for Immunotherapy: Neoantigens have gained significant attention in the field of cancer immunotherapy. The development of neoantigen-based vaccines, which stimulate the immune system to recognize and attack cancer cells bearing these unique antigens, represents a promising avenue for the treatment of cancer.

The discovery and targeting of neoantigens are part of the broader effort to harness the immune system's ability to recognize and destroy cancer cells while sparing healthy tissues. This approach offers the potential for more precise and effective cancer treatments, particularly in the era of

personalized medicine.

see Neoantigen peptide vaccine.

Immunotherapy-based treatment of glioblastoma has been challenging because of the tumor's limited neoantigen profile and weak immunogenicity.