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MRNA-based Personalized Cancer Vaccine NCI-4650

National Cancer Institute

Source

National Cancer Institute. *mRNA-based Personalized Cancer Vaccine NCI-4650*. NCI Thesaurus. Code C148239.

An mRNA-based therapeutic personalized cancer vaccine (PCV) targeting up to fifteen tumor-associated antigens (TAAs) that are specifically expressed by a patient's cancer cells, with potential immunostimulatory and antineoplastic activities. The cells from the patient's tumor are analyzed and subjected to RNA sequencing to identify mutant and immunogenic epitopes. The neoantigen epitopes are screened to select those that induce a strong immune response in tumor-infiltrating lymphocytes (TILs) isolated from the patient. The selected mRNA sequences encoding up to fifteen neoantigen epitopes are incorporated in a proprietary formulation designed to maximize mRNA delivery and minimize mRNA-triggered immune responses. Upon administration, the mRNA-based PCV NCI-4650 is taken up and the mRNAs are translated by antigen presenting cells (APCs). Then, the expressed epitopes are presented via major histocompatibility complex (MHC) molecules on the surface of the APCs. This induces both cytotoxic T-lymphocyte (CTL)- and memory T-cell-dependent immune responses that specifically target and destroy the patient's cancer cells that express these neoantigens.