

# Targeting Neoantigens for Precision Immune Cell Therapy against Cancers

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## Abstract

Personalized tumor-specific neoantigens have been considered as ideal targets for cancer immunotherapy. Neoantigens could be presented by the MHC molecules and then recognized by the T cell receptors (TCR) to induce the adaptive immunity, and trigger tumor-specific cytotoxic T cell killing. Targeting neoantigens for precision immunotherapy against cancers is becoming an emerging field for tumor treatment. The efficacy of neoantigens presentation to the immune system however may vary with the applied technologies as well as the patient populations due to the tumor heterogeneity, diversity of cancer somatic mutations, and MHC polymorphisms of individuals. Different approaches targeting neoantigens, including cancer vaccines and adoptive T cell therapy have been developing. We aim to develop personalized neoantigen-based T cell therapy for treating cancers. We enroll patients with advanced cancers in a clinical trial to evaluate the dosage, safety, tolerability, and efficacy of neoantigen-expanded autologous immune cell therapy. In the clinical setting, we investigate the patient-specific tumor somatic mutations to generate “personalized cancer vaccine”, and expand neoantigen-targeted T cells for cell therapy. Our data suggest that neoantigen-driven T cell therapy could lead to robust anti-tumor response and effective against the aggressive cancer even with dynamic change of tumor genome.