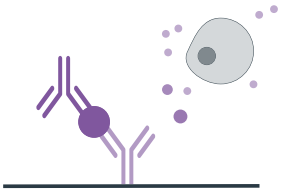
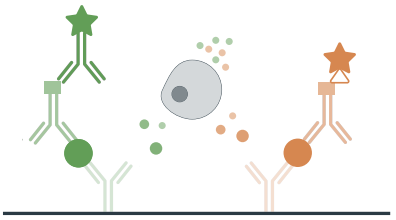
Immunogenicity assessment

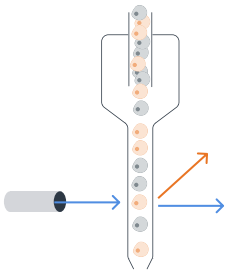
The **development of neoantigen-based vaccines** has become a promising approach in cancer immunotherapy due to their ability to elicit targeted immune responses. **Assessing the immunogenicity of these vaccines in preclinical animal models is critical to evaluating their potential efficacy and safety before entering clinical trials.** Key techniques focus on the detection and characterization of antigen-specific T-cell and antibody responses. In animal models, particularly mice, neoantigen vaccines are typically administered alongside adjuvants (e.g. TLR7 agonists) to stimulate robust immune responses. The immunogenicity of these vaccines is evaluated using several key assays:

EliSpot (Enzyme-Linked ImmunoSpot): This technique measures the amount of cytokine-secreting T-cells in response to specific neoantigen peptides. After immunization, splenocytes or peripheral blood mononuclear cells (PBMCs) are isolated and incubated with individual or pooled peptides. Cytokines such as IFN-γ, TNF-α, or IL-2 secreted by activated T-cells are captured and visualized as individual spots, allowing quantitative analysis of antigen-specific responses.



FluoroSpot: An advanced variant of EliSpot, FluoroSpot allows the simultaneous detection of multiple cytokines and antibodies at the single-cell level using fluorescence-tagged antibodies. This multiplexing capability is particularly valuable in assessing the polyfunctionality of T-cell responses, a key indicator of effective vaccine-induced immunity.

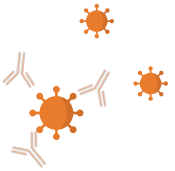




Flow cytometry and intracellular cytokine staining (ICS): These methods provide additional resolution by identifying specific T-cell subsets (CD4+ vs. CD8+) and their cytokine profiles. This is crucial for understanding the nature of the immune response elicited by the vaccine.

ELISA (Enzyme-Linked Immunosorbent Assay): This method can be used to quantify both cytokines and antibodies produced by the cells (detecting antigen-specific IgG titers in serum samples, for example).

Neutralization assays: With this type of assay the ability of antibodies - or antivirals - to inhibit the infectivity of a virus is measured.



The primary goal of immunogenicity studies is to identify and assess the immune response to therapeutic proteins and vaccines, specifically to understand its potential impact on clinical outcomes. This includes evaluating the effects on safety, efficacy, and pharmacokinetic/pharmacodynamic parameters. All of the above-mentioned assays can help to identify most promising vaccination candidates in context of preclinical and clinical development.