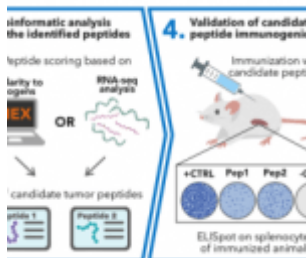


Enhanced production of effective and personalised vaccines for cancer



In a recent paper by Feola, et al., researchers have developed a pipeline for evaluating, prioritising and identifying potential tumour antigens for the production of vaccines against cancers. The pipeline covers the stages of personalised cancer vaccine development, from the start i.e. the isolation of peptides from a primary tumour to the analysis in order to identify the best antigen candidates (Figure 1). The pipeline currently being validated.

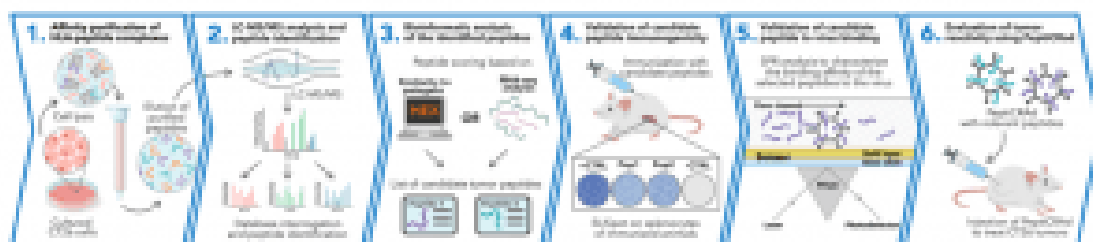


Figure 1: Schematic of the proposed immunopetidomic based pipeline. MHC-I peptides are immunopurified from the surface of tumor cells (Step1). Next, the peptides are analyzed by mass-spectrometry (Step2) and the generated list of peptides is investigated with two main approaches: RNAseq analysis and HEX software (Step 3). The selected peptides are then going through a functional characterization for their immunogenicity profile in vivo through ELISPOT assay (Step 4) and the best candidates are poly-lysine

modified and analyzed by Surface Plasmon Resonance (SPR) for their binding affinity to the oncolytic adenovirus, OAd (Step 5). Finally, the peptides are used to decorate OAd to generate therapeutic cancer vaccine (PeptiCRAd) and tested in tumor bearing mice (Step 6) (Feola, et al., 2022).

This new approach may aid researchers with the development of tumour-specific antigens which can be recognised by cytotoxic T cells. This will allow for the stimulation of a robust immune response against a target tumour based off of the antigen profile, additionally allowing for faster development of personalised cancer vaccines.

In the present study, the researchers began to describe the antigenic environment of the tumour cell by investigating the peptides that are present on the cells surface. Using state-of-the-art technologies to study cancer within a mouse model, they were able to generate a comprehensive list of peptide candidates and presented a way of how to prioritise specific peptides of interest. In order for a cancer vaccine to be effective, specific antigens that elicit a strong immune response need to be selected for or targeted. The antigens that are exclusively present on cancer cells can be tailored to an individual's unique tumour type.

Their findings demonstrated the feasibility of using their pipeline to generate a tailored cancer vaccines based on specific selection criteria whilst making use of the PeptiCRAd technology, further modifying an existing and approved clinical adenovirus vector with the selected peptides.

Journal article: Feola, S., et al., 2022. [A novel immunopeptidomic-based pipeline for the generation of personalized oncolytic cancer vaccines](#). *eLife*.

Summary by Stefan Botha