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# NeoScreen®

## – In Vitro Analysis of Potential Cancer Neo-Epitopes

The majority of T cell epitopes used in vaccine development are identified using *in silico* prediction algorithms. The most widely used prediction algorithms are the Immune Epitope Database and Analysis Resource (IEBD) and netMHC (refs. 1-4).

Both algorithms identify epitopes using models that incorporate multiple aspects of MHC class-specific affinity, which are based on binding motifs as well as experimental affinity measurements.

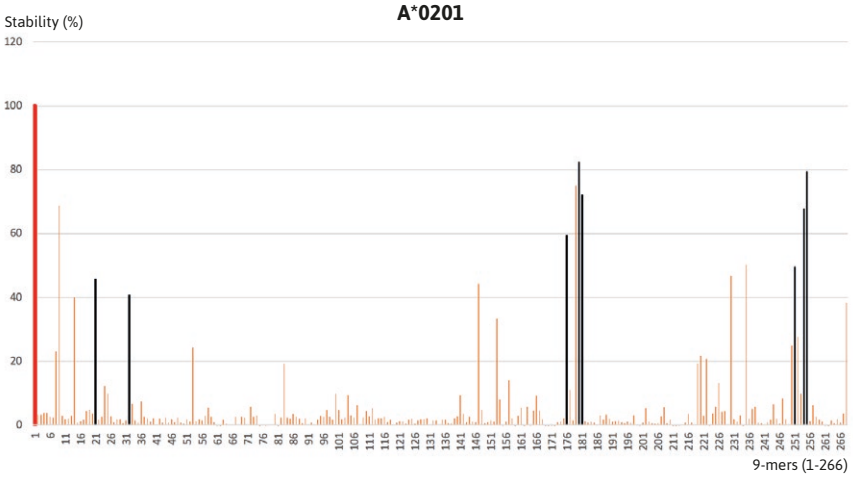
Although widely used, there are major limitations to affinity-based *in silico* strategies:

- For any epitope to be immunogenic, it must be able to bind a compatible MHC molecule and remain bound for long enough to be presented to and recognised by T cells to elicit an immune response. In other words, stable MHC/epitope interactions are required for immunogenicity.
- With the exception of very few alleles, the prediction tools are generally not precise.

**Immunitrack is currently the only company in the world that proposes high throughput MHC/epitope stability measurements.**

Based on our experience, which is heavily supported by multiple peer-reviewed articles, stability is a better predictor of immunogenicity than affinity (refs. 5-6). In the example shown below, by screening E6 and E7 proteins from human papilloma virus (HPV) for stably-binding epitopes to A*0201, we were able to identify all 9 confirmed T cell epitopes among our top 13 most stably-binding epitopes.

**A.**




**B.**

| | A*0201 Stab 1 | A*0201 Stab 2 | Av stab | Pred aff nM | IEDB |
|---|---|---|---|---|---|
| 1 | 82 | 84 | 83 | 50 | Yes |
| 2 | 75 | 77 | 76 | NB | Yes |
| 3 | 79 | 73 | 76 | NB | Yes |
| 4 | 72 | 72 | 72 | NB | Yes |
| 5 | 69 | 69 | 69 | NB | |
| 6 | 68 | 59 | 64 | 200 | Yes |
| 7 | 59 | 59 | 59 | 50 | Yes |
| 8 | 50 | 46 | 48 | 500 | |
| 9 | 50 | 44 | 47 | 50 | Yes |
| 10 | 46 | 47 | 46 | 200 | Yes |
| 11 | 47 | 42 | 44 | NB | |
| 12 | 44 | 44 | 44 | NB | |
| 13 | 41 | 47 | 44 | NB | Yes |

**Figures A and B** show the results of a stability analysis of 266 overlapping 9-mers from HPV E6 and E7. The red bar in **A** indicates a reference peptide that is a known T cell epitope, which is documented to bind stably to the MHC of interest. Stability of other peptides are calculated relative to this peptide (100% stability). Peptides marked in black are known A*0201-restricted HPV T cell epitopes from the Immune Epitope Database (IEDB). **B** displays stability measurements performed in duplicate (referred to as Stab 1 and Stab 2) for the 13 most stably-binding 9-mers. Remarkably, 9 of the top 13 binders are confirmed T cell epitopes (based on IEDB data). Prediction tools trained on affinity can only predict 5 confirmed T cell epitopes (see column Pred aff in nM – NB stands for non-binding).

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# Typical NeoScreen® Service Workflow

**Immunitrack's NeoScreen® platform can help your company to identify MHC-restricted CD4 or CD8 epitopes from any cancer, biotherapeutic, viral or bacterial pathogen, fast and with unmatched precision.**

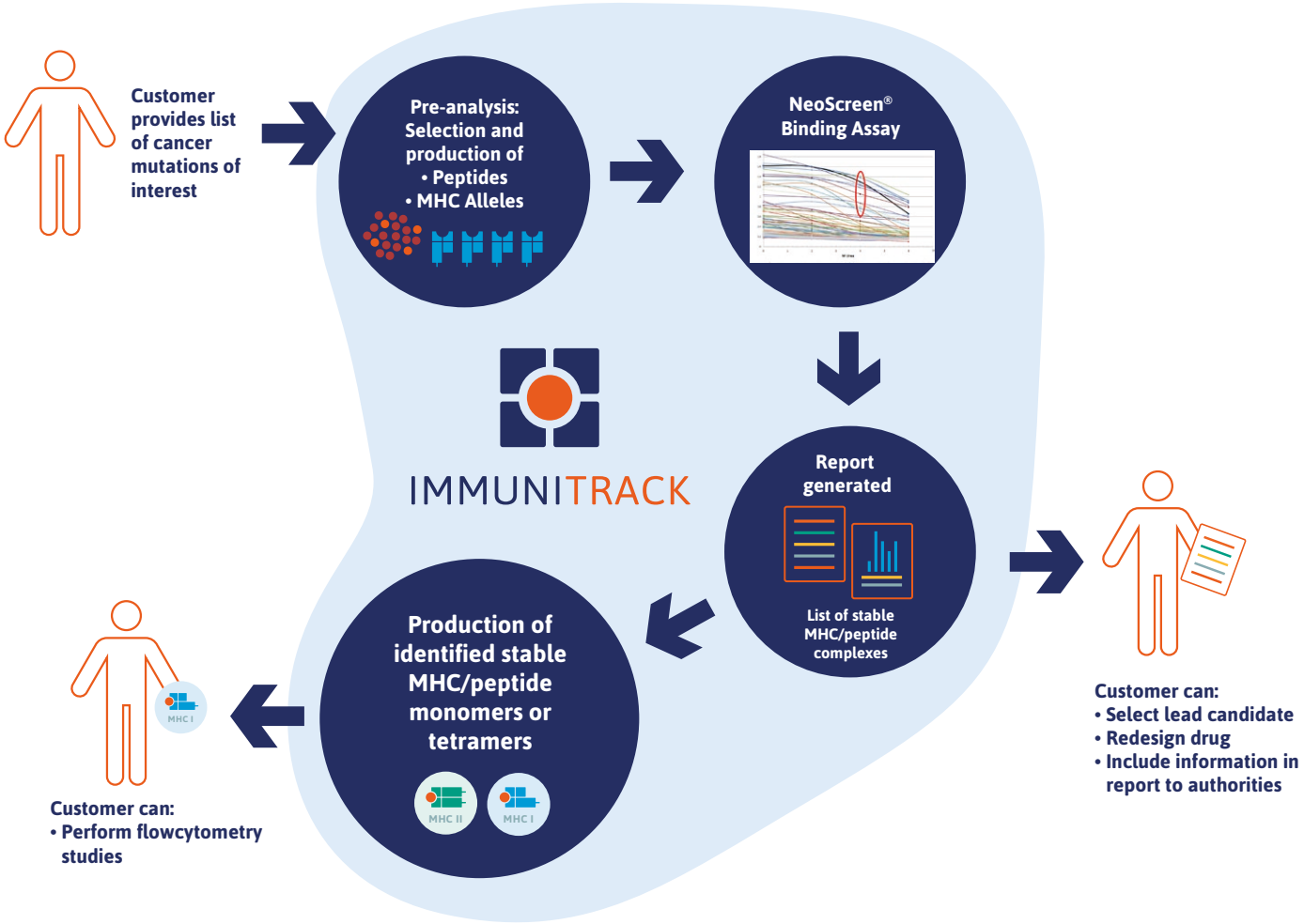


**Figure 1.** Typical NeoScreen® Service Workflow. Note that customers may also approach Immunitrack with the sequence of a biotherapeutic or a viral or bacterial antigen of interest.

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## The ultimate selection of immunogenic cancer neo-epitopes

**Do you work in the fields of immuno-oncology or vaccine design, or with the development of biologics?**

**Call us to learn more about how we can help you to assess the ability of any epitope to elicit a CD8 and/or CD4 T cell response.**

**Europe: +45 2868 2159 · North America: +1 774 757 0386**

**Read more about the NeoScreen® Technology on our webpage:**

**www.immunitrack.com/neoscreen-technology**


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**About Immunitrack**

Immunitrack is founded upon world-leading research on MHC-epitope binding. Our proprietary epitope screening platform NeoScreen® measures the affinity and stability of MHC/epitope interactions, with capacity to rapidly screen libraries with thousands of (neo-)epitopes for applications within immuno-oncology, vaccine production, T cell therapies and immune monitoring.

Immunitrack's mission is to provide the pharmaceutical industry and research community with technology and reagents to select or redesign drug candidates during early R&D and to monitor the effects of lead drug candidates on patient immune responses.


**References**

[1] Nucleic Acids Res 2012, 40 (Web Server issue), W525-30.
[2] Protein Sci 2003, 12 (5), 1007-17.
[3] Immunology 2010, 130 (3), 309-18.
[4] Immunome Res 2008, 4, 2.
[5] Cancer Immunol Res 2019, 7 (1), 50-61.
[6] Eur J Immunol 2012, 42 (6), 1405-16