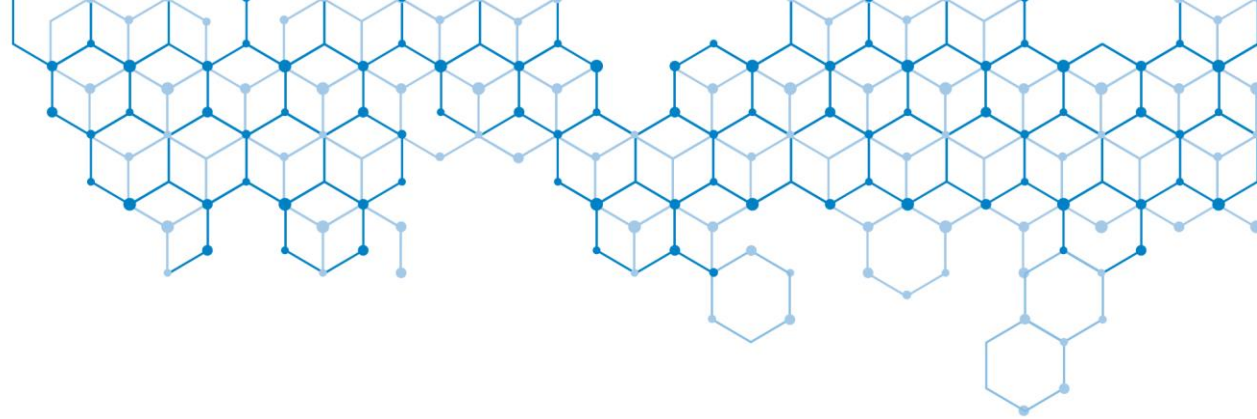
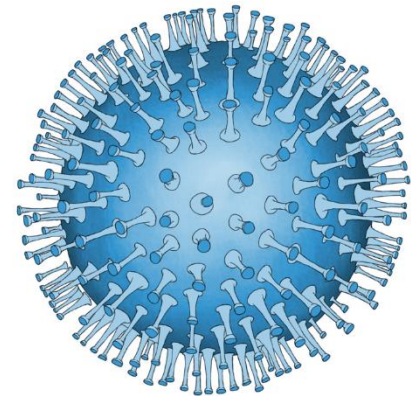
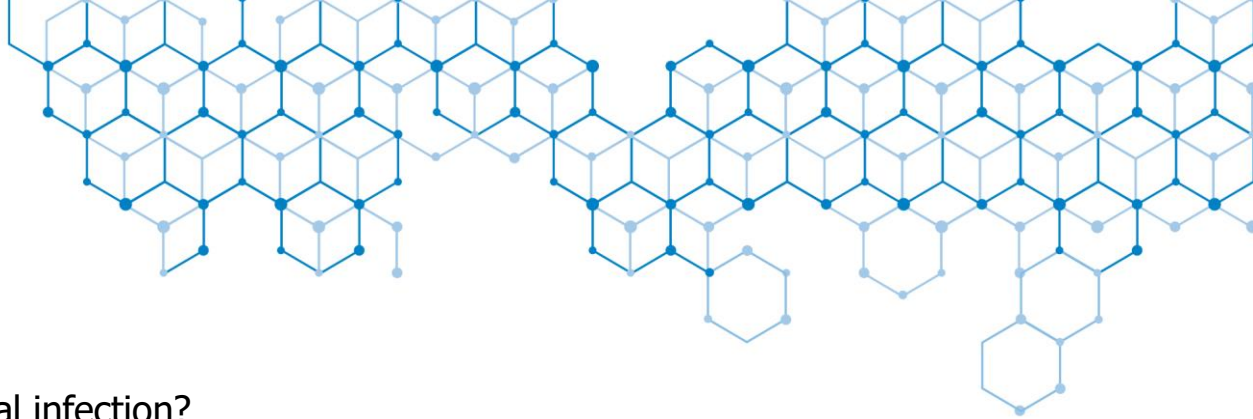


# Peptides and Viruses



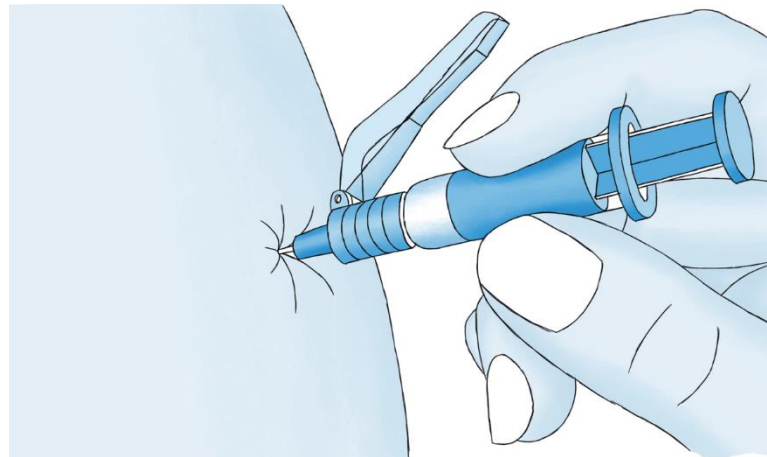
- Viruses are capsuled nucleotides that enter and use hosting cells. The hosting cell is reprogramed by the virus in a way that it is going to produce new viruses and release them to infect more cells.
- Viruses always need a hosting cell for replication and they are not considered to be creatures.
- That is why antibiotics are not able to treat viral infections.



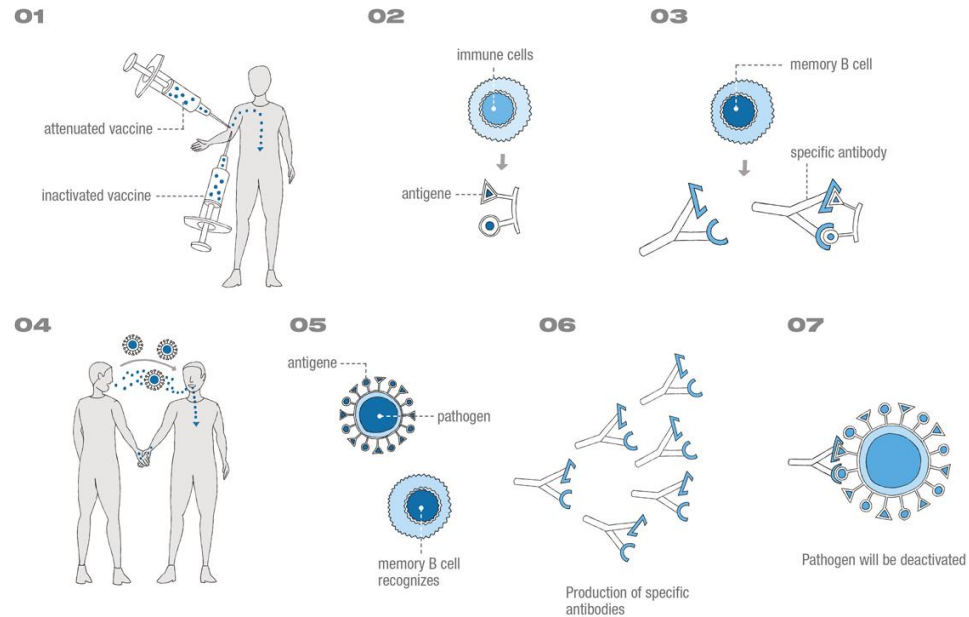


So how do we to treat a viral infection?

The best way to treat a viral infection is to prevent it by vaccination.



## Humoral immunity



01 Traditional vaccines contain attenuated viruses, deactivated viruses or virus particles in general called antigens that do not lead to an infection.

02 The vaccine antigen is recognized by immune cells.

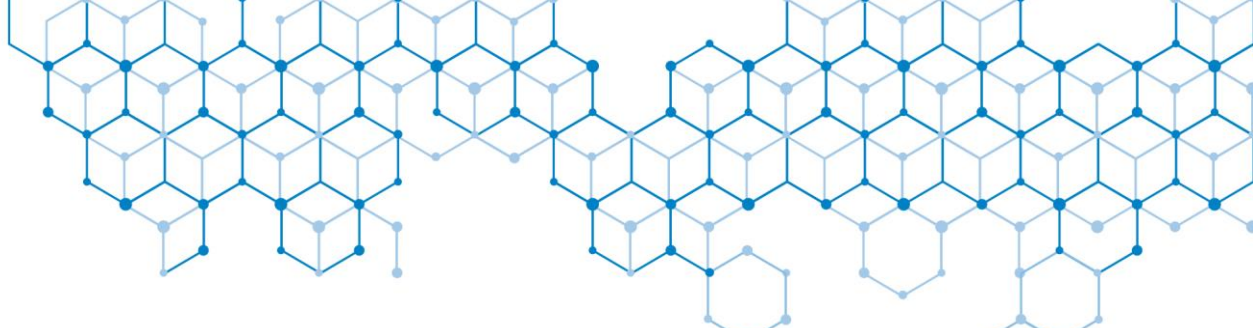
03 Memory B cells that produce specific antibodies are generated.

04 The vaccinated person is infected by the viral pathogen.

05 The antigen presenting viral pathogen is identified by the specific memory b cells.

06 Specific antibodies are released.

07 The viral pathogen is deactivated via the specific antibodies.

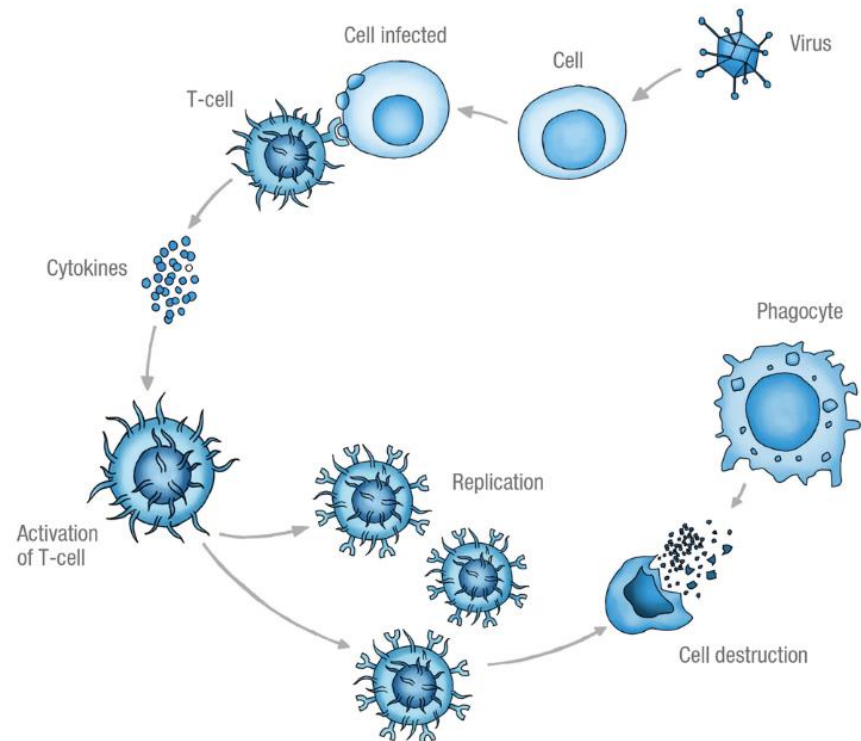


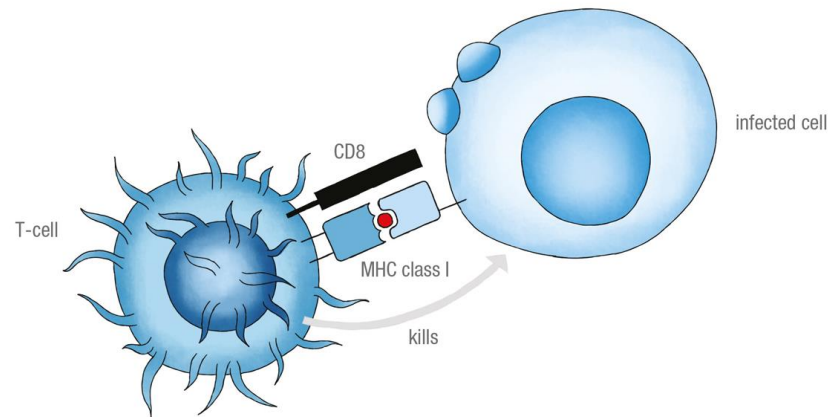
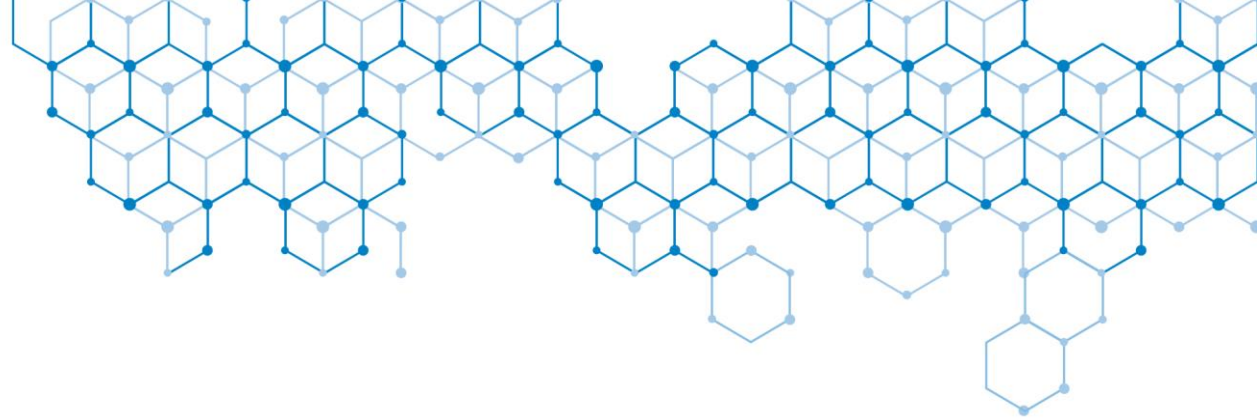
## Cell-mediated immunity

Once a virus has entered a hosting cell, it is protected from the humoral immune response and the cellular arm of the immune system has to be activated.

The virus is using the host's protein synthesis machinery and its new synthesized proteins will be degraded and presented by MHC Class I Molecules.

CD8 T-Cells can recognize the presented peptides and induce apoptosis of the infected cells.

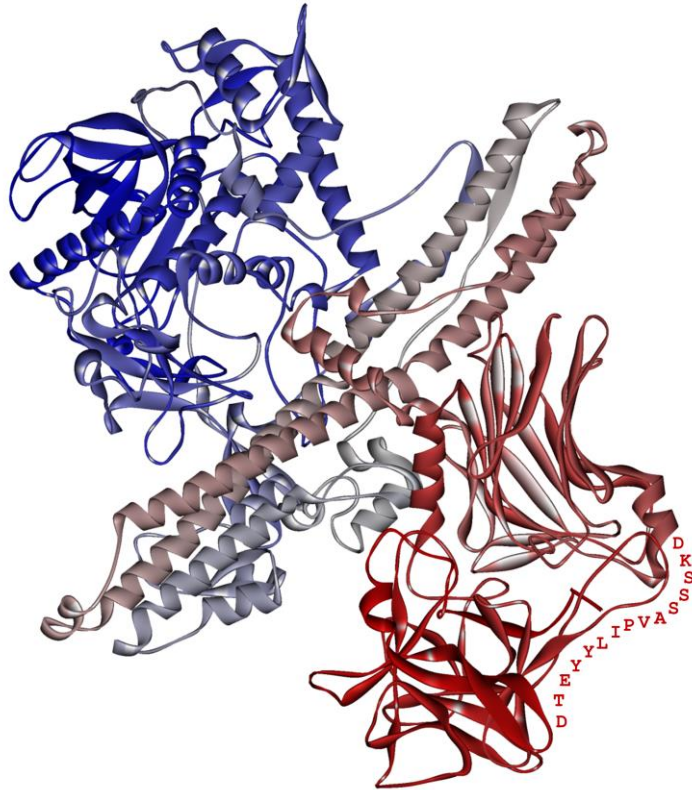
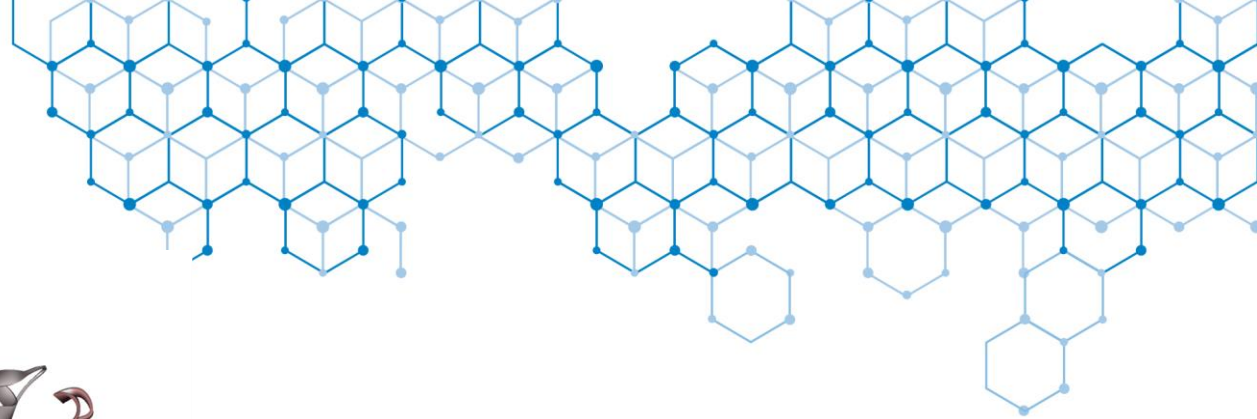




Viral infected cells do present viral protein peptides via MHC Class I Molecules .

CD8 T-Cells recognize the presented peptides and induce apoptosis of the infected cells.

This mechanism is mainly used for therapeutic vaccinations. Immunogenic peptides derived from viral proteins can be used for these types of vaccines.



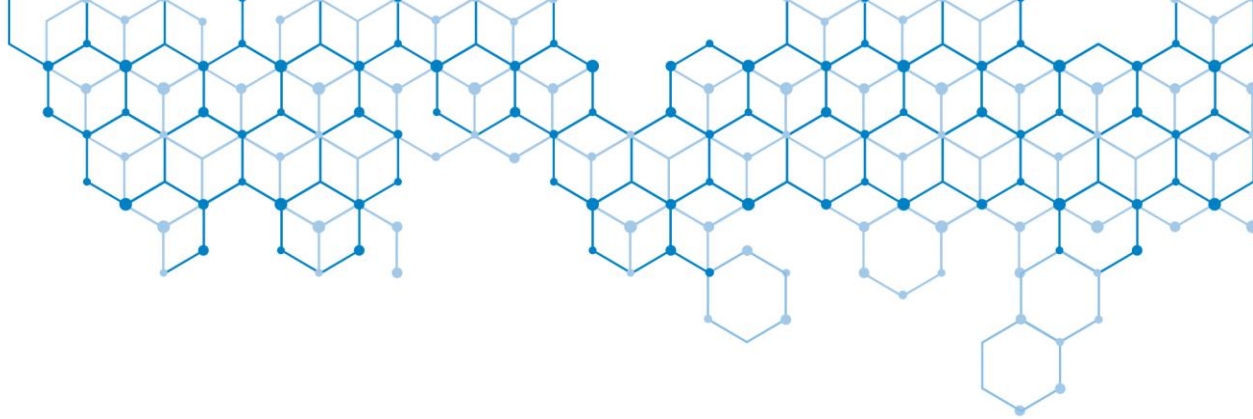
## Epitope Mapping

A general method to identify immunogenic peptides

Example Mapping of the Tetanus Toxin

...LGAIREDDNITLKLDRCNNNQYVSIDKFRIFCKALNPKEIEKLYTSYLSITFLRDFWGNPLRY**DTEYLLIPVASS**KDVQLKNITDYMILTNA...

... ..  
 FWGNPLRY**DTEYLLI**  
 PLRY**DTEYLLIPV**  
**DTEYLLIPVASS**KD  
**YLIPVASS**KDVQLK  
**VASS**KDVQLKNITD  
 ... ..



The standard protocol of epitope mapping is to get the primary sequence of the protein from the protein database.

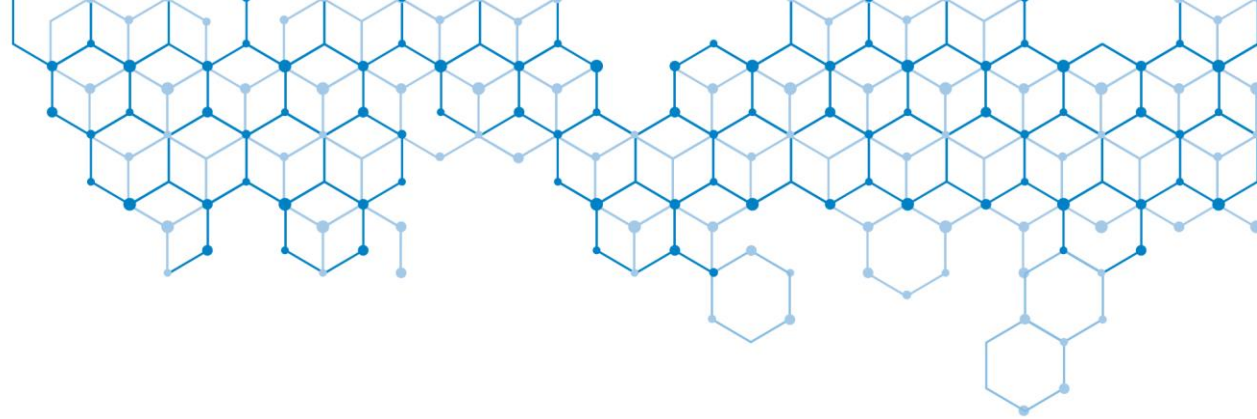
The protein sequence is divided into 15 amino acid overlapping epitopes. The overlap is typically 11 amino acids.

...LGAIREDNNITLKLDRCNNNNQYVSIDKFRIFCKALNPKEIEKLYTSYLSITFLRDFWGNPLRY**DTEYYLIPVASSKD**VQLKNITDYMILTNP...

... ..  
FWGNPLRY**DTEYYLI**  
PLRY**DTEYYLIPVAS**  
DTEYYLIPVASSKD  
YLIPVASSKDVQLK  
VASSKDVQLKNITD  
... ..

The peptide epitopes are synthesized using the high parallel LIPS Technology from **peptides&elephants**



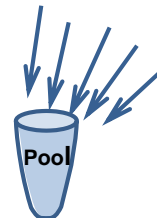


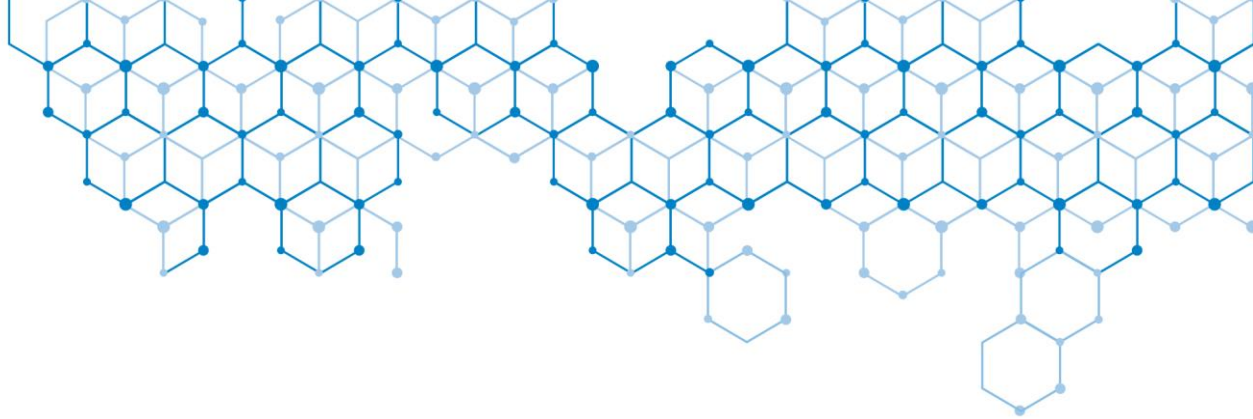
To test peptide epitopes there are two general strategies:

The first strategy is to create peptide pools that contain all epitopes of the protein. The pools are tested to evaluate if there is an immunogenic response allowing to discriminate if this specific protein is involved in the immune reaction.

...LGAIREDNNITLKLDRCNNNNQYVSIDKFRIFCKALNPKEIEKLYTSYLSITFLRDFWGNPLRY**DTEYYLIPVASSSKD**VQLKNITDYMILTAP...

... ..  
 FWGNPLRY**DTEYYLI**  
 PLRY**DTEYYLIPVAS**  
**DTEYYLIPVASSSKD**  
**YLIPVASSSKDVQLK**  
**VASSSKDVQLKNITD**  
 ... ..

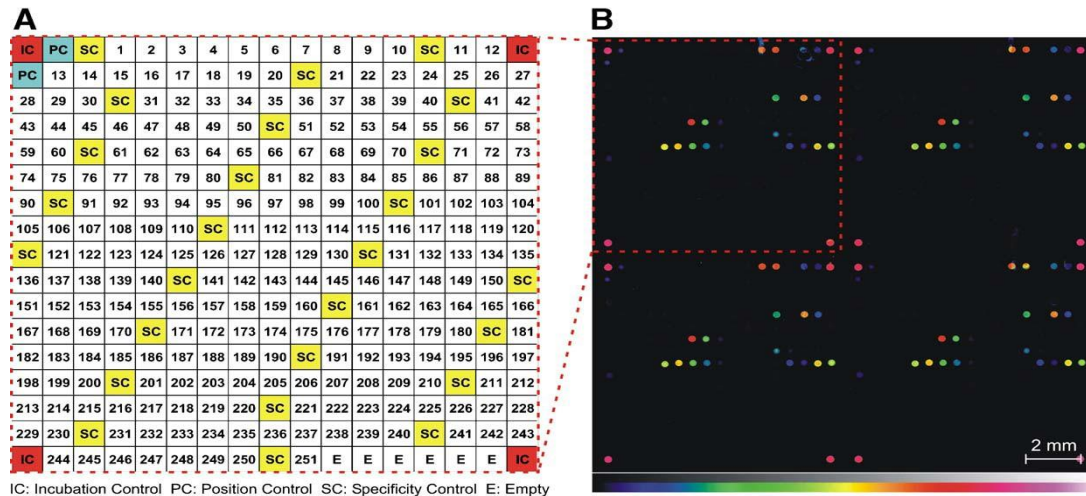


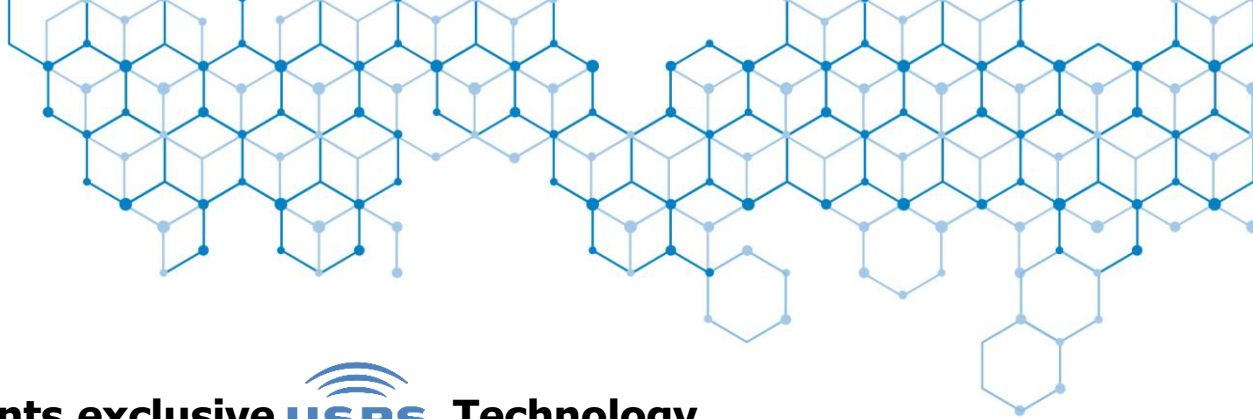


The second strategy is to break down the immunologic reaction to the individual peptide. The synthesized peptides are arranged to a peptide array.

A parallel assay is performed to test the immunologic reaction for each individual peptide.

This method allows a fast identification of the exact sequence of the immunogenic peptides.

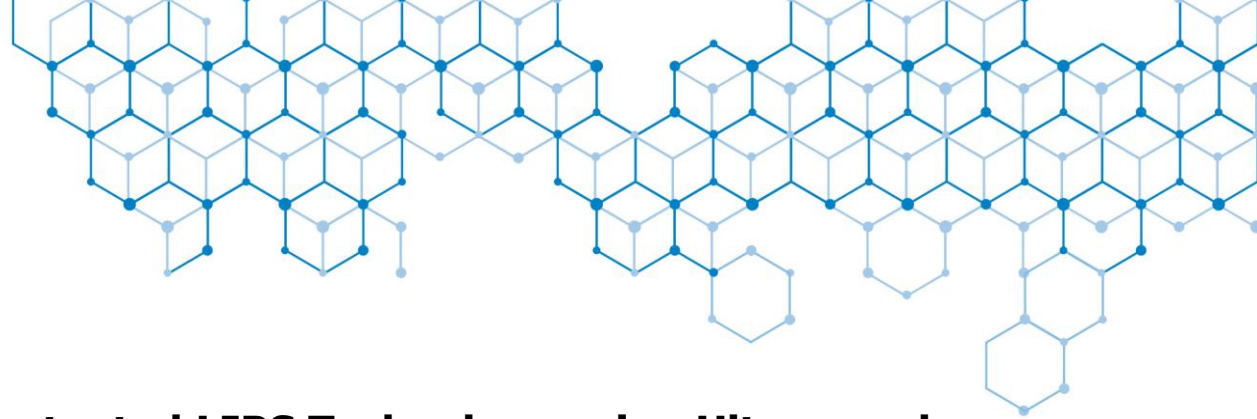




peptides&elephants exclusive **USPS** Technology

- ultrasonic supported super fast synthesis
- 2  $\mu\text{mol}$  scale, up to 40 AA
- Free of cross contamination
- Suitable for T-Cell Assays
- Upscaling for Clinical Neoantigens
- Sterile
- free of Endotoxins

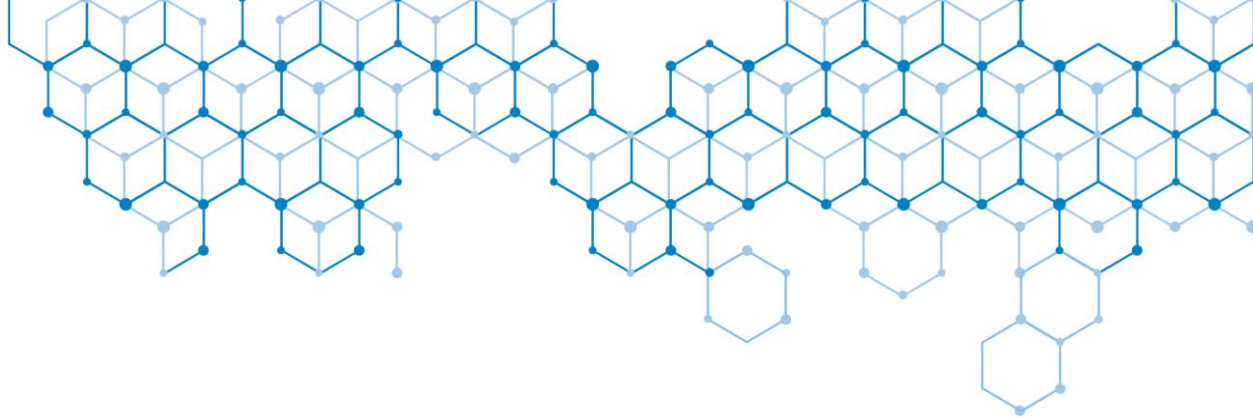




## peptides&elephants patented LIPS Technology using Ultrasound

- 96 Well Multiprep synthesis plates
  - Proprietary Pipette Technology
- } ***No cross contamination***

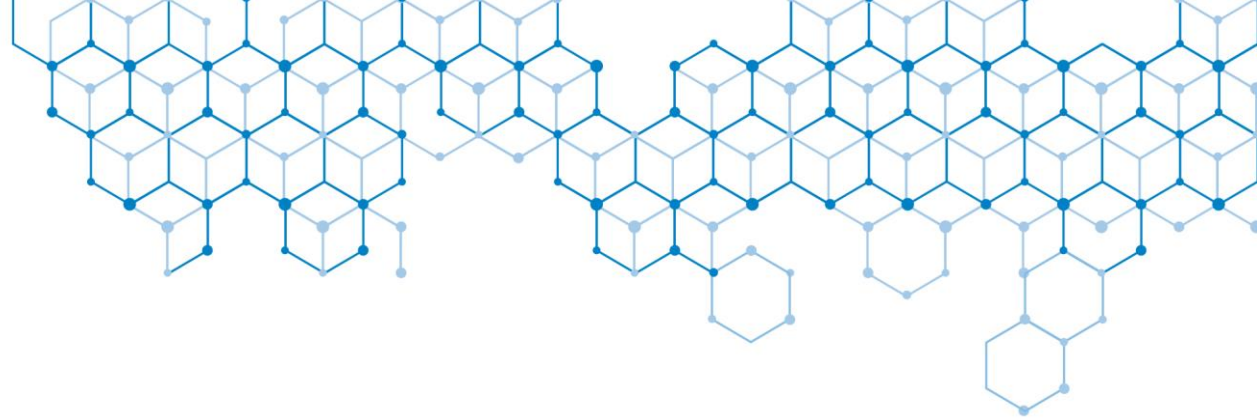




## What we offer:

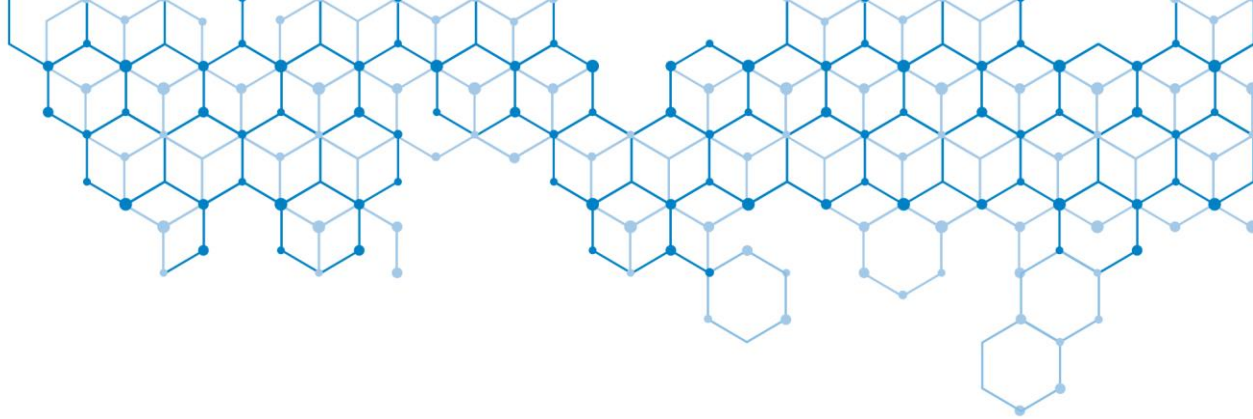
- **High quality** premanufactured peptides and peptide pools in stock.
- Superior **customer care**
- Excellent **technical support** and **consulting**
- **Continuous updates** regarding the status of your orders
- ...and our precise **aliquotation service** for your perfect satisfaction





## Selected References

- Djordje Atanackovic et al, Deep dissection of the antiviral immune profile of patients with COVID-19, *Commun Biol.* 2021; 4: 1389.
- Nivetha Krishna Moorthy et al, Low-Level Endothelial TRAIL-Receptor Expression Obstructs the CNS-Delivery of Angiopep-2 Functionalised TRAIL-Receptor Agonists for the Treatment of Glioblastoma, *Molecules.* 2021 Dec; 26(24): 7582
- Wilbert Mbuya et al, Depletion of Human Papilloma Virus E6- and E7-Oncoprotein-Specific T-Cell Responses in Women Living With HIV, *Front Immunol.* 2021; 12: 742861.
- Janna Heide et al, Broadly directed SARS-CoV-2-specific CD4+ T cell response includes frequently detected peptide specificities within the membrane and nucleoprotein in patients with acute and resolved COVID-19, *PLoS Pathog.* 2021 Sep; 17(9): e1009842.
- Donjete Simnica et al, Landscape of T-cell repertoires with public COVID-19-associated T-cell receptors in pre-pandemic risk cohorts, *Clin Transl Immunology.* 2021; 10(9): e1340.
- ..... more references on request



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