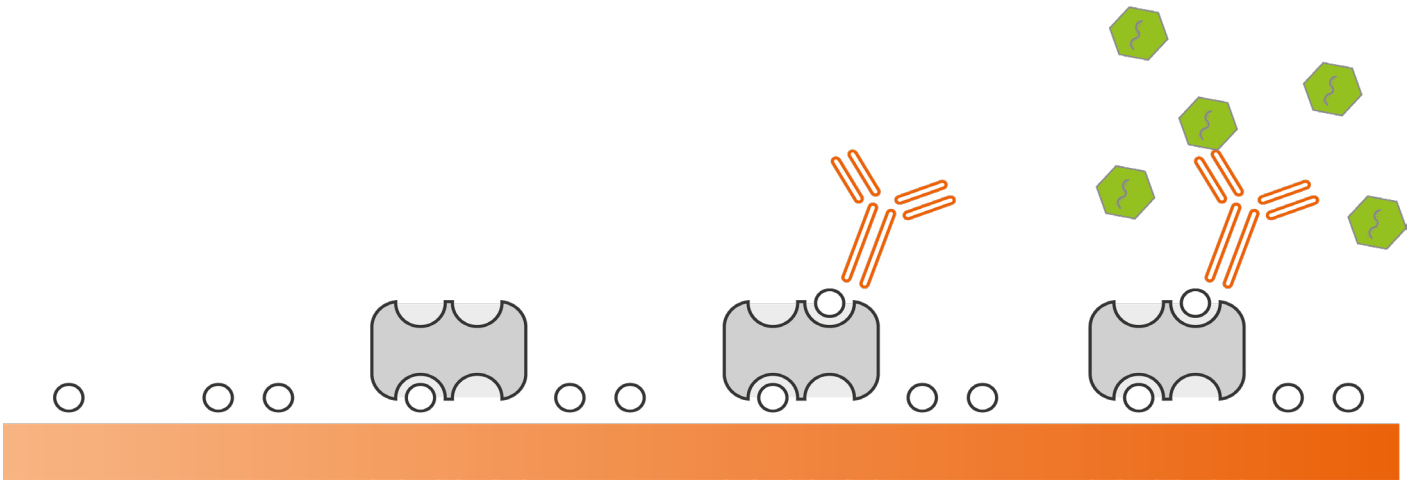
BioNavis

REAL-TIME, LABEL-FREE INSIGHT INTO VIRUS INTERACTIONS USING MP-SPR

Quantify virus binding, entry mechanisms, and neutralization kinetics



Multi-Parametric Surface Plasmon Resonance (MP-SPR) is a powerful, label-free optical technique, which can be used to study real-time interactions between viruses and biological surfaces, such as lipid membranes, receptor proteins, and even living cells. Due to unique instrumental setup, MP-SPR allows for real-time measurements of up to micrometer-thick layers and biological entities in various media.

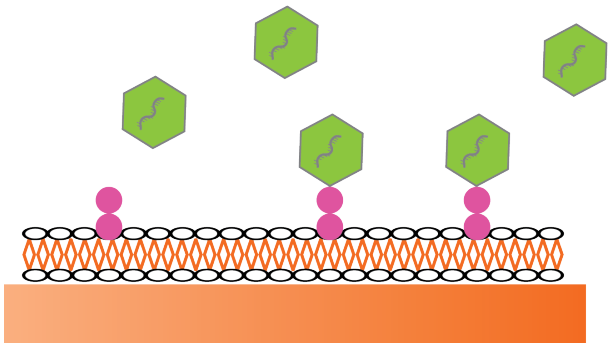
VIRUS RESEARCH APPLICATIONS OF MP-SPR:

- What is the binding affinity of a virus to host cell receptors?
- Can viral entry be inhibited by candidate antibodies or drugs?
- How do viral particles interact with lipid membranes?
- What is the route and kinetics of virus internalization in live cells?

WHY CHOOSE MP-SPR FOR VIRUS STUDIES?

Mimic the host environment in a label-free manner

Use supported lipid bilayers (membrane mimics), receptor-functionalized surfaces, or whole cells to replicate virus-host interactions. MP-SPR enables precise control and monitoring of membrane/layer integrity and composition during measurement.



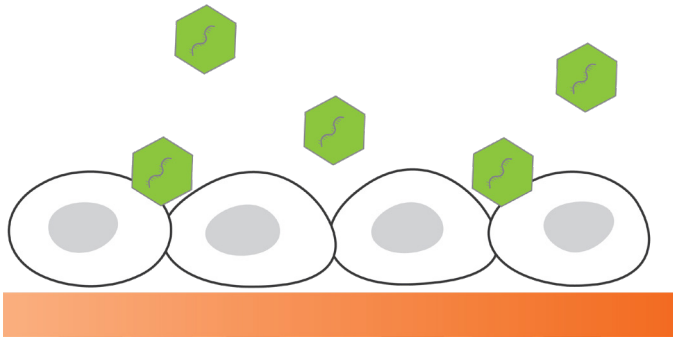
Easy formation of lipid bilayers on SiO_2 sensors for studying virus–lipid bilayer interactions

Track virus binding & neutralization in real-time

Measure binding kinetics of viruses or viral antigens to their target ligands (e.g., peptides, antibodies). Reveal EC50 of antiviral compounds or neutralizing antibodies. Distinguish between specific vs. nonspecific interactions with measurements on same surface and parallelization capability.

Study virus internalization with living cells

Similarly to nanoparticles, due to MP-SPR simultaneous measurement of peak minimum intensity (PMI) and peak minimum angle (PMA), viruses or virus-like particles may be monitored in real-time for cellular uptake using DMR (dynamic mass redistribution) profiling.



Measurement of cell uptake – Application Note #145

Regenerable sensors

With BioNavis regenerable avidin kit for biotinylated ligands, regenerate surfaces up to 80 cycles for continued measurements of antibody-antigen interactions.

Any sample, any surface

Measure interactions in serum, saliva, buffer, or cell culture media. Functionalize sensor surfaces with host cell receptors (e.g., ACE2, sialic acid) targeted by viruses, virus-like particles or glycoproteins using *ex situ* or *in situ* methods. Our gold sensors use a superior adhesion layer that allows for repeated cleaning with acid-based solutions, therefore can often be re-used. We provide many other coated sensor surfaces including SiO_2, TiO_2, Pt, but also functionalized surfaces, such as carboxymethyl dextrans, His-Tag and more.

Peptide-coated viruses for interaction analysis in vaccine development – Application Note #145

BioNavis MP-SPR instruments

High-sensitivity, high-precision, fully automated systems — versatile models to meet every research need.

Contact BioNavis or your local partner for more information.

Further reading

AN#156 Nanoparticle uptake by cells measured using MP-SPR

AN#145 Virus interaction studies using MP-SPR

Selected publications

Peptide Ligands for the Affinity Purification of Adenovirus from HEK293 and Vero Cell Lysates
(Wu *et al*., Journal of Chromatography A , 2024)

Variant-specific Interactions at the Plasma Membrane: Heparan Sulfate's Impact on SARS-CoV-2 Binding Kinetics
(Conca *et al*., Analytical Chemistry , 2025)

Rapid and sensitive detection of maize chlorotic mottle virus using surface plasmon resonance-based biosensor.
(Zeng *et al.*, Analytical Biochemistry, 2013)