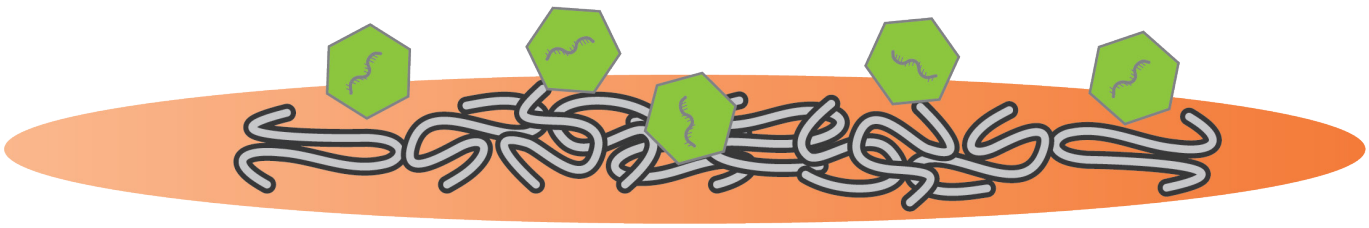
BioNavis

QUANTIFY VIRAL INTERACTIONS THROUGH MASS AND VISCOELASTIC CHANGES USING QCMD

Measure virus binding, aggregation, competition with other molecules, and release



Quartz Crystal Microbalance with Dissipation Monitoring (QCMD) is a highly sensitive, label-free technique that measures mass changes and viscoelastic properties at surfaces in real time.

In virus research, QCMD is used to study how viruses bind to or interact with host receptors, lipid membranes, or antiviral coatings. It can detect nanogram-level binding of viral particles, monitor structural changes such as capsid disassembly or aggregation, and evaluate how antiviral agents affect the mechanical properties of virus layers or infected cells. This makes QCMD a valuable tool for probing virus adsorption, competition with other molecules, and inactivation mechanisms with exceptional precision.

VIRUS RESEARCH APPLICATIONS OF QCMD:

- How much virus binds to a surface or receptor?
- What is the rigidity or softness of the formed viral layer?
- Can we detect virus aggregation or capsid rupture?
- Do antiviral drugs affect the viscoelastic profile of virus particles?

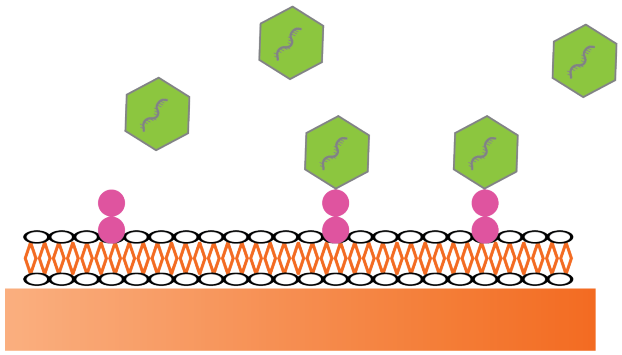
WHY CHOOSE QCMD FOR VIRAL STUDIES?

Direct mass and rigidity detection

QCMD provides simultaneous measurement of bound mass and viscoelastic properties — key for differentiating between virus binding, aggregation, or disassembly

Monitor virus-membrane interactions

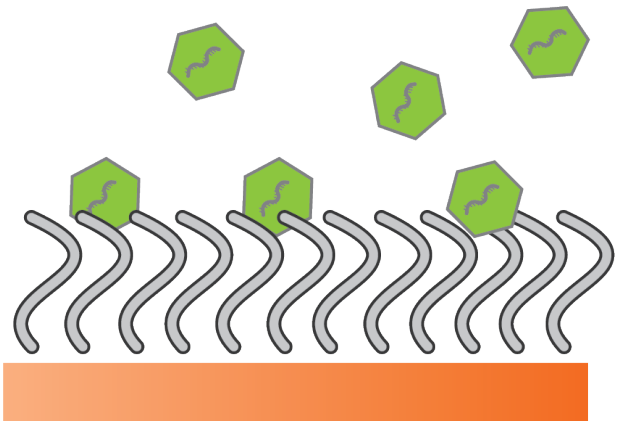
Observe binding of viral particles to supported lipid bilayers or artificial membranes. Study hemifusion, membrane rupture, or capsid destabilization.



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

Evaluate coatings for antiviral surfaces

Characterize coatings such as peptides, polymers, or nanomaterials that resist virus adsorption or promote inactivation. Measure effectiveness in real-time.



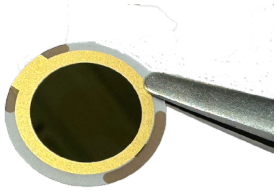
Virus–material and coating binding interactions

Determine virus particle size

Using QCMD, we analyze changes in frequency and bandwidth during virus adsorption to estimate particle size. This method tracks how these signals vary with particle size and surface coverage, providing reliable results through data interpretation.

Ex situ and *in situ* coated sensor slides

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, Cu, Fe, and others.



BioNavis QCMD instruments

High-precision tools for sensitive analysis of molecule-surface interactions. Featuring wide temperature control, fast measurement rates, easy sensor handling (QuickLock cells), and advanced flow options for comprehensive kinetic and viscoelastic studies.

Selected publications

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