

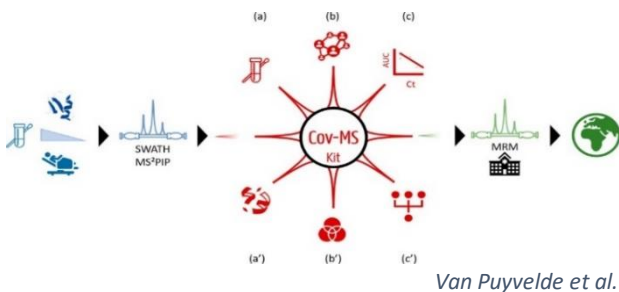
## Mass-Spectrometry-Based Detection of SARS-CoV-2 Infection

During the SARS-CoV-2 pandemic, the demand for molecular diagnostics increased rapidly and capacities for RT-PCR often reached their limits. Therefore, a consortium of academic and industrial laboratories was founded aiming to develop an alternative method employing mass spectrometry. PolyQuant joined the consortium, contributing a QconCAT reference standard that was used for method setup, optimization and the final clinical assay.

### Cov-MS reference standard

Cov-MS ([PQ-CS-2500ff](#)) is a synthetic protein assembled of proteotypic peptides for the spike protein and the highly expressed nuclear capsid protein (NCAP) that are unique for SARS-CoV-2 and peptides that are also present in SARS-CoV, coronaviridae and their lowest common ancestor (LCA).

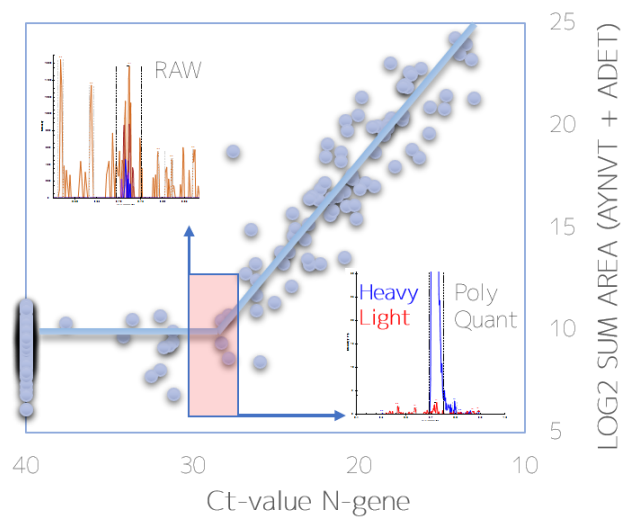
Additionally, Cov-MS comprises of control peptides for histone H2A, H2B, H3 and H4 to determine sample quality and synthetic peptides for workflow calibration and standardisation (complementing product: RePLiCal, PQ-CS-1561).



### Diagnostics using mass spectrometry

Mass spectrometry allows detection of proteins with high sensitivity and specificity and therefore has high potential in clinical applications. Van Puyvelde *et al* ([JACS Au, 2021](#)) could show that mass spectrometry allowed the detection of a SARS-CoV-2 infection in clinical samples (nasopharyngeal swabs) with a high agreement with RT-qPCR. While RT-PCR measures mRNA levels, mass spectrometry detects protein, which could prove a better proxy for infectiousness of the patient.

### MS and qPCR Correlation (SISCAPA)



### Developing a Clinical Assay

Van Puyvelde *et al* established a clinical protocol using SISCAPA Technology, allowing detection of SARS-CoV-2 infection down to Ct30 using mass spectrometry instrumentations readily available in diagnostic laboratories ([Anal. Chem., 2022](#)).

Their robust, sensitive and specific diagnostic test includes a control assessing for sample quality using a QconCAT from PolyQuant as reference standard. This reference standard (Cov-MS) facilitates workflow optimization, absolute quantification of the viral load, inter-laboratory comparison and automation of peak detection.



### References:

- Cov-MS: A Community-Based Template Assay for Mass-Spectrometry-Based Protein Detection in SARS-CoV-2 Patients [[PubMed](#)]
- Cov<sup>2</sup>MS: An Automated and Quantitative Matrix-Independent Assay for Mass Spectrometric Measurement of SARS-CoV-2 Nucleocapsid Protein [[PubMed](#)]