Clinical Performance of the VITROS® Immunodiagnostic Products Anti-SARS-CoV-2 IgG Assay

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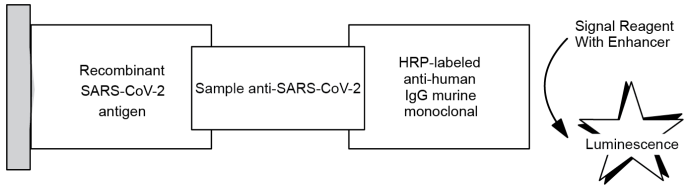
Introduction

This study was designed to assess the analytical and clinical performance of the VITROS Immunodiagnostic Products Anti-SARS-CoV-2 IgG assay (VITROS SARS-CoV-2 IgG) on the VITROS ECi/ECiQ/ 3600 Immunodiagnostic Systems and the VITROS 5600/ XT 7600 Integrated Systems.

Method

Antibody detection in VITROS SARS-CoV-2 IgG assay is achieved using SARS-CoV-2 spike S1 protein antigen coated onto the well. Sample is added to the coated well in the first stage of the reaction, and SARS-CoV-2 antibody from the sample is captured. After washing, HRP conjugated murine monoclonal anti-human IgG antibodies are added. Following a final wash, bound HRP conjugates are detected using the VITROS signal reagent. The assay cut-off for VITROS SARS-CoV-2 IgG is 1.00; values equal to or above the cut-off are Reactive for SARS-CoV-2 IgG antibodies and values below 1.00 are Non-reactive.

Assay Architecture



Precision

Precision was evaluated consistent with CLSI document EP05. Two replicates each of 6 fluids, a mix of human sample pools and commercial controls, were tested on two separate occasions per day for five test days.

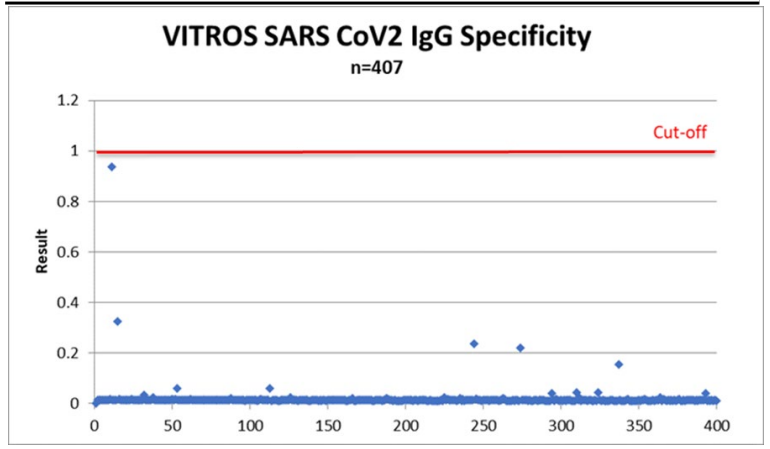
Mean (S/C)	Within-run*		Within-calibration**		No. Observations	No. Days
	SD	%CV	SD	%CV		
0.02	0.001	N/A***	0.004	N/A***	20	5
3.34	0.115	3.45	0.332	9.95	20	5
1.03	0.048	4.67	0.077	7.49	20	5
0.50	0.023	4.61	0.029	5.81	20	5
3.94	0.071	1.80	0.238	6.04	20	5
4.27	0.187	4.38	0.264	6.18	20	5

* Within-run (repeatability). Between duplicate precision averaged over all runs.
** Within-calibration. Total precision with weighted components of within-run, between-run, and between-day variation.
*** NA = Not Applicable, % CV are not meaningful when S/C approaches zero.

Clinical Specificity

Clinical specificity was evaluated using frozen serum samples from 407 healthy blood donors collected prior to 2019 and the COVID-19 pandemic. Specificity in the blood donor population for VITROS SARS-CoV-2 IgG was 100% (407/407) with a 95% exact confidence interval of 99.1-100.0%.

Samples	Number of Test Samples	Number of Repeat Reactive	Number of Non-reactive	Observed Specificity
Blood Donors	407	0	400	100.0%



Potentially Cross-reacting Subgroups and Substances that don't Interfere

The VITROS Anti-SARS-CoV-2 IgG test was evaluated for interference. Of the compounds tested, none was found to interfere with the clinical interpretation of the test in Non-reactive and weakly Reactive samples at the concentrations indicated. In addition potential cross-reactivity by Adenovirus, Influenza A and B, Coxsackie, Echovirus, HCV, Polio, RSV and ANA antibodies was evaluated with all samples testing Non-reactive.

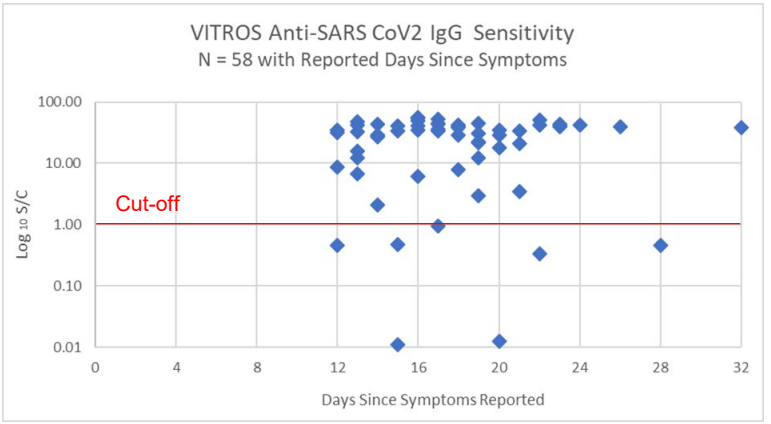
Compound	Concentration	
Bilirubin, conjugated	40.0 mg/dL	475 µmol/L
Bilirubin, unconjugated	40.0 mg/dL	684 µmol/L
Biotin	3510 ng/mL	14.3 µmol/L
Hemoglobin	1000 mg/dL	0.156 mmol/L
Intralipid	2000mg/dL	N/A

N/A = Not applicable (alternate units are not provided)

Clinical Sensitivity

Clinical sensitivity was evaluated using 58 samples from 58 individuals diagnosed as SARS-CoV-2 positive by PCR, frozen and then sent to the R&D lab for evaluation. Date of reported onset of symptoms was reported for all 58 samples. The observed sensitivity (percent positive agreement with PCR) of VITROS SARS-CoV-2 IgG assay was 90.0% (36/40) for samples collected >15 days after onset of symptoms were reported with a 95% exact confidence interval of 76.3 to 97.2%.

Days Since Symptoms Reported	Reactive	Non-Reactive	Total	PPA (95% CI)
12-15	15	3	18	83.3% (58.6–96.4%)
>15	36	4	40	90.0% (76.3–97.2%)



Conclusion

The VITROS Anti-SARS-CoV-2 IgG assay demonstrates excellent clinical sensitivity and specificity.

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