SARS-CoV-2 NP IgA ELISA Kit (CAT NO: 41A248R)

For qualitative determination of human anti-SARS-CoV-2 nucleocapsid protein (NP) ELISA (IgA class antibodies) in serum or plasma samples

This package insert must be read in its entirely before using this product
SARS-CoV-2 NP IgA ELISA Kit
Enzyme-linked Immunosorbent Assay for qualitative detection of IgA class antibodies against the NP of SARS-CoV-2 in human blood.

Catalog Numbers 41A248R
(Please read this instruction manual carefully before use.)

WARNING! Wear appropriate protective eyewear, clothing and gloves.

BACKGROUND
SARS-CoV-2 is an enveloped virus with a positive-sense RNA genome and a nucleocapsid of helical symmetry. Nucleocapsid protein (NP) is the most abundant protein on the helical nucleocapsid of coronaviruses, which plays an important role during host cell entry and virus particle assembly. Anti-NP antibodies have been shown to be the earliest and the most predominant antibodies detectable in patient’s blood samples after infection. Immunoglobulin A (IgA) plays a crucial role in the immune function of mucous membranes. In the blood, IgA interacts with Fc receptor to initiate inflammatory responses.

INTENDED USE
SARS-CoV-2 NP IgA ELISA Kit is a highly sensitive and specific immunoassay developed by ImmunoDiagnostics for qualitative detection of IgA class antibodies against the NP of SARS-CoV-2 in human blood. This product is intended for research use only.

ASSAY PRINCIPLE
96-well plates are coated with SARS-CoV-2 NP protein that captures antibodies against SARS-CoV-2 NP protein in the sample. After washing away unbound materials, captured IgA against SARS-CoV-2 NP is detected by anti-human IgA monoclonal antibodies conjugated with horse radish peroxidase (HRP), which is specific to human IgA, with no cross-reaction with human IgG or IgM. After washing step, the chromogenic substrate 3,3’,5,5’-tetramethylbenzidine (TMB) is added. Color reaction is stopped by 2M H₂SO₄. The amount of IgA class antibodies against SARS-CoV-2 NP captured inside the wells is proportional to the color density generated in the coupled oxidation-reduction reaction.

REAGENTS SUPPLIED
Each kit is sufficient for 96 tests and contains the following components:

1. One aluminum pouch with a Microwell plate (12 strips of 8 wells each) coated with SARS-CoV-2 NP protein, sealed. The microwell strips can be used separately.
2. 10×Wash buffer-40 ml.
3. 5×Assay buffer-20 ml.
4. 100×Detection antibody solution: HRP-conjugated anti-human IgA monoclonal antibody, 0.12 ml.
5. 10×Human anti-NP IgA antibody (positive control), 22 ul
7. Stop solution, 12 ml, ready for use.
8. Blank control, 0.5 ml, ready to use

OTHER MATERIALS REQUIRED, BUT NOT PROVIDED

1. Pipettes and pipette tips.
2. Beakers, flasks, cylinders necessary for preparation of reagents.
3. Buffer and reagent reservoirs.
4. Paper towels or absorbent paper.
5. Plate reader capable of reading absorbency at 450 nm.
6. Distilled water or deionized water.
7. Statistical calculator with program to perform regression analysis.

STORAGE
- The kit should be stored at 2-8°C, and all reagents should be equilibrated to room temperature before use. Immediately after use remaining reagents should be returned to cold storage (2-8°C).
- Expiry of the kit and reagents is stand on labels.
- Once opened, the strips may be stored at 2-8°C for up to one month.

SAMPLE COLLECTION AND STORAGE INSTRUCTIONS
Handle serum or plasma sample in accordance with National Committee for Clinical Laboratory Standards guidelines for preventing transmission of blood-borne infection.
- Do not use grossly hemolyzed or lipemic samples.
- Human Serum: Use a blood separator tube and allow sample to clot for 30 minutes, then centrifuge for 10 minutes at 1000g. When the human serum is tested, it should be diluted 100-fold at least.
- Human plasma: Treat blood with anticoagulant such as citrate, EDTA or heparin. Centrifuge for 10 minutes at 1000g within 30 minutes for plasma collection. When the human plasma is tested, it should be diluted 100-fold at least.
- Samples cannot be tested immediately should be aliquoted and must be stored frozen below -20°C. Avoid repeated freeze-thaw cycle.
- Perform preliminary experiment to determine the optimum detection sample dilution.

PRECAUTIONS FOR USE
- All chemicals should be considered as potentially hazardous. Avoid contact with skin and eyes. In the case of contact with skin or eyes wash with water.
- Do not use kit reagents beyond expiration date.
- Do not expose kit reagents to strong light.
- Do not pipet by mouth.
- Do not eat or smoke in area where kit reagents or samples are handled.
- Use only sufficient volume of specimen as indicated in the procedure steps. Failure to do so, may cause low sensitivity of the assay.
- Avoid contact of substrate solution with oxidizing agents and metal.
- Use disposable pipette tips and/or pipettes.
- Use clean, dedicated reagent trays for dispensing the conjugate and substrate reagent.
- Do not touch the exterior bottom of the wells; fingerprints or scratches may interfere with the reading. When reading the results, ensure that the plate bottom is dry and there are no air bubbles inside the wells.
- The enzymatic activity of the HRP-conjugate might be affected from dust and reactive chemical and substances like sodium hypochlorite, acids, alkalis etc. Do not perform the assay in the presence of these substances.
- Substrate solution must be at room temperature prior to use.

PREPARATION OF REAGENTS
Bring all reagents and materials to room temperature prior to use
1. 1×Wash buffer.
Prepare 1×Wash buffer by mixing the 10×Wash buffer (40 ml) with 360 ml of distilled water or deionized water. If precipitates are observed in the 10× Wash buffer bottle, warm the bottle in a 37°C water bath until the precipitates disappear. The 1×Wash buffer may be stored at 2-8°C for up to one month.
2. 1×Assay buffer.
Prepare 1x assay buffer by mixing the 5x assay buffer (20 ml) with 80 ml of distilled water or deionized water. If precipitates are observed in the 5x assay buffer bottle, warm the bottle in a 37°C water bath until the precipitates disappear. The 1x assay buffer may be stored at 2-8°C for up to one month.

3. 1xDetection antibody solution.
Spin down the 100xDetection antibody solution briefly and dilute the desired amount of the antibody 1:100 with 1xAssay buffer, 100 μL of 1xDetection antibody solution is required per well. Prepare only as much 1xDetection antibody solution as needed. Return the 100xDetection antibody solution to 2-8°C immediately after the necessary volume is pipetted.

**PREPARATION OF SAMPLES AND POSITIVE CONTROL**

Serum or plasma sample is generally required a 100-fold dilution in the 1X Assay buffer. A suggested dilution step is to add 2 μL of sample to 198 μL of 1X Assay buffer. Dilution factor can be adjusted based on the titer of the antibodies in the samples.

Briefly centrifuge the tube. Add 200 μL 1X Assay buffer and mix thoroughly.

**ASSAY PROCEDURE**

*It is recommended that all samples be assayed in duplicate.*

1. Add 100μl of Blank Control, Positive Control and diluted samples into their respective wells, and incubate at room temperature for 1 hour, preferably with shaking at 600 rpm. Duplicate test is recommended.
2. Discard the content and tap the plate on a clean paper towel to remove residual solution in each well. Add 300 μl of 1×Wash buffer to each well and incubate for 1 minute. Discard the 1×Wash buffer and tap the plate on a clean paper towel to remove residual wash buffer. Repeat the wash step for a total of 3 times.
3. Add 100 μl of 1×Detection antibody solution to each well, incubate at room temperature for 1 hour.
4. Wash each well 3 times as described in step 2.
5. Add 100 μl of Substrate solution to each well, incubate at room temperature for 15 minutes. Protect from light.
6. Add 100 μl of Stop solution to each well, gently tap the plate frame for a few seconds to ensure thorough mixing.
7. Determine the optical density of each well at 450 nm immediately.

**TYPICAL DATA**

<table>
<thead>
<tr>
<th>BLANK</th>
<th>0.076</th>
<th>0.11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.172</td>
<td>0.189</td>
</tr>
<tr>
<td></td>
<td>0.204</td>
<td>0.245</td>
</tr>
<tr>
<td></td>
<td>0.164</td>
<td>0.172</td>
</tr>
<tr>
<td></td>
<td>0.211</td>
<td>0.245</td>
</tr>
<tr>
<td></td>
<td>0.17</td>
<td>0.211</td>
</tr>
<tr>
<td></td>
<td>0.104</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>0.204</td>
<td>0.204</td>
</tr>
<tr>
<td></td>
<td>0.105</td>
<td>0.105</td>
</tr>
<tr>
<td></td>
<td>0.114</td>
<td>0.114</td>
</tr>
<tr>
<td></td>
<td>0.159</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td>0.143</td>
<td>0.143</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COVID-19 patients</th>
<th>0.439</th>
<th>1.166</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.11</td>
<td>0.215</td>
</tr>
<tr>
<td></td>
<td>0.625</td>
<td>2.222</td>
</tr>
<tr>
<td></td>
<td>6.082</td>
<td>2.269</td>
</tr>
<tr>
<td></td>
<td>0.673</td>
<td>0.438</td>
</tr>
<tr>
<td></td>
<td>0.222</td>
<td>0.381</td>
</tr>
<tr>
<td></td>
<td>0.568</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.234</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.142</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.17</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.076</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.105</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.104</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.105</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.114</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.159</td>
<td>1.279</td>
</tr>
<tr>
<td></td>
<td>0.143</td>
<td>1.279</td>
</tr>
</tbody>
</table>
DATA LAYOUT

<table>
<thead>
<tr>
<th>BLK</th>
<th>BLK</th>
<th>S7</th>
<th>S7</th>
<th>S15</th>
<th>S15</th>
<th>S23</th>
<th>S23</th>
<th>S31</th>
<th>S31</th>
<th>S39</th>
<th>S39</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>PC</td>
<td>S8</td>
<td>S8</td>
<td>S16</td>
<td>S16</td>
<td>S24</td>
<td>S24</td>
<td>S32</td>
<td>S32</td>
<td>S40</td>
<td>S40</td>
</tr>
<tr>
<td>S1</td>
<td>S1</td>
<td>S9</td>
<td>S9</td>
<td>S17</td>
<td>S17</td>
<td>S25</td>
<td>S25</td>
<td>S33</td>
<td>S33</td>
<td>S41</td>
<td>S41</td>
</tr>
<tr>
<td>S2</td>
<td>S2</td>
<td>S10</td>
<td>S10</td>
<td>S18</td>
<td>S18</td>
<td>S26</td>
<td>S26</td>
<td>S34</td>
<td>S34</td>
<td>S42</td>
<td>S42</td>
</tr>
<tr>
<td>S3</td>
<td>S3</td>
<td>S11</td>
<td>S11</td>
<td>S19</td>
<td>S19</td>
<td>S27</td>
<td>S27</td>
<td>S35</td>
<td>S35</td>
<td>S43</td>
<td>S43</td>
</tr>
<tr>
<td>S4</td>
<td>S4</td>
<td>S12</td>
<td>S12</td>
<td>S20</td>
<td>S20</td>
<td>S28</td>
<td>S28</td>
<td>S36</td>
<td>S36</td>
<td>S44</td>
<td>S44</td>
</tr>
<tr>
<td>S5</td>
<td>S5</td>
<td>S13</td>
<td>S13</td>
<td>S21</td>
<td>S21</td>
<td>S29</td>
<td>S29</td>
<td>S37</td>
<td>S37</td>
<td>S45</td>
<td>S45</td>
</tr>
<tr>
<td>S6</td>
<td>S6</td>
<td>S14</td>
<td>S14</td>
<td>S22</td>
<td>S22</td>
<td>S30</td>
<td>S30</td>
<td>S38</td>
<td>S38</td>
<td>S46</td>
<td>S46</td>
</tr>
</tbody>
</table>

PRECISION

Intra-assay: Three different known levels of positive control were spiked into sample buffer as test samples. All samples were tested on the same plate to evaluate intra-assay precision of the kit. The Intra-assay precision of this kit is less than 8%.

Inter-assay: Three different known levels of control were spiked into sample buffer as test samples. All samples were tested in 3 separate assays to evaluate intra-assay precision of the kit. Inter-assay precision of this kit is less than 10%.
SUMMARY OF ASSAY PROCEDURE

Add 100 μl of sample to each well.

↓

Incubate at room temperature for 1 hour preferably with shaking at 600 rpm.

↓

Aspirate and wash each well three times.

↓

Add 100 μl of 1×Detection antibody solution to each well.

↓

Incubate at room temperature for 1 hour.

↓

Aspirate and wash each well three times.

↓

Add 100 μl of Substrate solution to each well.

↓

Incubate at room temperature for 15 minutes.

↓

Add 100 μl of Stop solution to each well.

↓

Measure absorbance of each well at 450 nm.

↓

Interpretation