

Overview of Covid19 Diagnosis

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Diagnostic test ideal for detecting COVID19

COVID19 is a disease originated by the coronavirus SARS-Cov-2. Since the terrible moment when this infection appeared in Wuhan (China) in 2019, Humanity as a whole has required the development and implementation of diagnostic assays to detect the presence of the infection in individuals affected by the virus. These tests must meet certain requirements to be considered ideal: sensitive, specific, relatively low cost and easy to use in a short time. To obtain kits with these characteristics, research groups from all over the world have dedicated themselves to the task of scientific-technological development and evaluation to determine the highest quality parameters, to then be put on the market for commercialization.

Assays diagnostic using for detection of COVID19

Review of the tests used for the diagnosis of COVID19.

Molecular test

RT-PCR assay: Directly detects COVID19 through its genetic material, by amplifying nucleic acids from samples taken from the test individual, it is for this reason that it allows to detect active infections. The collection of fluids is carried out by inserting a long nasal swab (nasopharyngeal exudates). RT-PCR is the Gold Standard Assay for the qualitative detection of SARS-CoV-2 infection [1], used as a reference in the standardization of any other test for its commercialization.

RT-PCR has several advantages, due to its sensitivity and specificity is a method chosen during the initial phase (10 days post infection), when there is still no production of antibodies. However, it has some limitations because it is a highly complex technique that requires specialized personnel and equipment, to obtain results in about 4 hours [2].

Serological tests

Chemiluminescence immunoassay (CLIA): Allow the quantitative determination of anti-SARS-CoV-2 antibodies, in serum or plasma; use a solid phase with antigens of SARS-CoV-2, for example: RBD, S, N, S+N, and S1+S2 [3,4]. Immune complex are detected by adding secondary antibodies labeled with a light generating substance measured on an automated analyzer. The produced light emission (relative light unit [RLU]) by indirect immunoassay (IA) reaction is proportional to the specific Ab quantity in the sample. RLUs are then transformed to arbitrary units (AU/mL), using a computed 10-point calibration curve [5].

Examples are VITROS Immunodiagnostic Products SARS-CoV-2 Antigen Reagent Packaging de Ortho Clinical Diagnostic. Inc [6] and Diazyme SARS-CoV-2 assay of Diazyme [7].

ELISA: Quantitative method that uses polystyrene plates sensitized with antigens virus or antibodies that capture specific proteins of virus. S (mainly RBD) and/or N viral proteins of SARS-CoV-2 as these are highly immunogenic, being the target of many neutralizing antibodies [8]. Some of the commercially available kits are: Anti-SARS-Cov-2 (Ig) producido por EUROIMMUN US Inc. that detect SARS-CoV-2 antigen S1 specific IgG, showed sensitivity 50 - 100% sensitivity and 98.5% specificity [9]. A commercial ELISA kit designed by Sino Biological for SARS-CoV-2 antigen detection is based on the principle of SARS-CoV-2 Spike RBD protein detection by capturing it with HRP labeled anti-SARS-CoV-2 Spike RBD monoclonal antibody [10].

Rapid diagnostic test: Immunochromatographic assays that do not require specialized equipment for their execution, therefore, they do not need to be carried out in a specialized laboratory. The results are obtained easily and quickly in about 15 minutes. This test requires small blood samples for the detection of IgM and IgG, therefore the collection is done through of digital punctation.

In conclusion, ELISA, Rapid Diagnostic Test and Chemiluminescence, only allow to determine the presence of antibodies, that is, if a person was in contact with SARS-CoV-2. On the other hand, RT-PCR allows detecting active infections, for this reason it is considered the Gold Standard Test in the field of diagnosis of infections produced by SARS-Cov-2.

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