OPEN ACCESS Freely available online

Journal of Medical Diagnostic Methods

ISSN: 2168-9784

Opinion Article

Coronavirus Disease (COVID-19) Detection Using Electrochemical Biosensors

Alfred Richard*

Department of Chemistry, Texas A and M University, Texas, USA

ABOUT THE STUDY

For public health, the continuing COVID-19 pandemic represents a fresh obstacle. Prevention and management of infection have become urgent and serious issues. The creation of quick and effective procedures is a crucial first step in meeting the clinical demand for higher COVID-19 detection accuracy. The most popular COVID-19 diagnosis techniques, which rely on computed Tomography, Real-Time Fluorescent Quantitative PCR (RT-qPCR), and next-generation sequencing technologies, have a number of benefits, particularly for early diagnosis and screening. Additionally, the combined efforts of researchers from around the world have resulted in the development of additional rapid detection techniques based on technologies like DPCR and ELISA that have high sensitivity, are simple to use, are inexpensive, or allow for multiplex analysis. Microfluidic Detection chips and Fluorescence Immuno-chromatography assays are two examples. This review's main objective was to compare the benefits and drawbacks of these various analytical methods, which were based on Aetiology, Serology, and molecular biology, and to provide a critical analysis of their development and use. Hematology and Biochemistry, in addition to auxiliary analysis based on pathological anatomy, Ultrasonography, and Cytokine Detection, will help understand COVID-19 Pathogenesis in addition to these techniques. Together, these technologies could advance research, provide fresh perspectives on problems relating to symptomatic and asymptomatic COVID-19 infections, and enhance clinical approaches to lowering mortality. The SARS-CoV2 related coronavirus disease 2019 (COVID-19) pandemic, also known as 2019 NCOV by the World Health Organization (WHO), began by the November 2019 and has escalated quickly around the globe [1].

Currently, asymptomatic individuals and patients developing pneumonia after contracting SARS-CoV2 infection serve as the main sources of infection, and respiratory droplets serve as the primary method of transmission. The virus may also spread over time if people are exposed to Aerosols with high concentrations. Direct Mucous Membrane contact with hands that have previously touched a surface contaminated with SARS-CoV2 can result in infection. It should be noted that the Oral-Fecal route is one way that SARS-CoV2 can spread. Due to their lack of visibility and clinical symptoms, SARS-CoV2-infected individuals also present additional complexity, uncertainty, challenges, and difficulties to the prevention and control of epidemics. It is crucial to monitor, follow, isolate, and treat infected individuals who are not exhibiting any symptoms [2].

The primary symptoms of SARS-CoV2 infection include a dry cough, fever, shortness of breath, and respiratory distress. Patients who have severe conditions eventually develop Acute Respiratory Distress Syndrome (ARDS). Once infected with SARS-CoV2, elderly people or people with underlying illnesses are more likely to develop severe and critically severe pneumonia.

They are susceptible to developing acute respiratory distress syndrome, which results in respiratory failure, if treatment is delayed. Early diagnosis, intervention, and treatment of COVID-19 patients are therefore crucial. Currently, techniques based on aetiology, serology, and chest imaging are used to diagnose COVID-19. The gold standard for detecting this pathogen is DNA sequencing and Real-Time Fluorescent Quantitative PCR (RT-qPCR) [3].

Serum antibodies against SARS-CoV2 are found using immune chromatography and the ELISA method. For imaging detection, Computed Tomography (CT) and X-rays are used. In addition, new Nucleic Acid Analysis-based detection techniques, like multiplex PCR and Nucleic Acid Microfluidic detection chips, are being created and used quickly [4].

For epidemic control and clinical diagnosis, early COVID-19 detection is crucial. Serum samples considered during both the acute and recovery phases are better suited for the application of immunological technology for the detection of anti-SARSCoV2 antibodies. The first Serum sample ought to be taken as soon as possible (ideally within seven days of the disease's onset), and the second ought to be taken three to four weeks later. It is advised to use a vacuum blood collection vessel without anticoagulant for the 5 ml sample volume. RT-qPCR is a technology that simultaneously amplifies and detects nucleic acid products. Reverse Transcriptase first converts the virus's RNA into complementary DNA (cDNA). Then, a qPCR reaction is carried out with cDNA as the template [5].

Correspondence to: Alfred Richard, Department of Chemistry, A and M University, Texas, USA, E-mail: Rbrtprk1717@gmail.com

Received: 31-Oct-2022, Manuscript No. JMDM-22-20755; **Editor assigned:** 03-Nov-2022, PreQC No. JMDM-22-20755 (PQ); **Reviewed:** 22-Nov-2022, QC No. JMDM-22-20755; **Revised:** 01-Dec-2022, Manuscript No. JMDM-22-20755 (R); **Published:** 10-Dec-2022, DOI: 10.35248/2168-9784.22.11.391.

Citation: Richard A (2022) Coronavirus Disease (COVID-19) Detection Using Electrochemical Biosensors. J Med Diagn Meth. 11:391.

The report group's Fluorescence signal is absorbed by the quencher Fluorophore once the probe has fully annealed to the target sequence. The Taq enzyme's 5′ 3′ Exonuclease activity breaks down the probe nucleotides during PCR amplification, separating the fluorescent report group from the fluorescent Quencher Group, and producing a Fluorescence signal. In other words, a fluorescence molecule is created for each DNA strand amplification. Fluorescence signal accumulating is perfectly timed with the development of PCR products. Three gene loci were identified by RT-qPCR using this technique: The E gene, the *RDRP* gene in the Orf1ab fragment, and the N gene. Quick confirmation that the pathogen is SARS-CoV-2 is possible with this assay.

CONCLUSION

This technique, which can measure both relative and absolute gene expression levels with higher sensitivity, specificity, and accuracy at the same time than traditional PCR methods, has made a breakthrough from qualitative to quantitative results. The possibility of sample contamination can be decreased because the detection process is entirely closed. Meanwhile, since further analysis is not necessary, detection time can be greatly decreased.

REFERENCES

1. Morawska L, Milton DK. It is time to address airborne transmission of Coronavirus Disease 2019 (COVID-19). Clin Infect DisClinical Infectious Diseases 2020;71(9):2311-2313.
2. Abboah-Offei M, Salifu Y, Adewale B, Bayuo J, Ofosu-Poku R, Opare-Lokko EB. A rapid review of the use of face mask in preventing the spread of COVID-19. International journal of nursing studies advances. 2021;3:100013.
3. Orooji Y., Sohrabi H., Hemmat N., Oroojalian F., Baradaran B., Mokhtarzadeh A., Mohaghegh M., Karimi-Maleh H. An overview on SARS-CoV-2 (COVID-19) and other human coronaviruses and their detection capability *via* amplification assay.
4. Harapan H., Itoh N., Yufika A., Winardi W., Keam S., Te H., Megawati D., Hayati Z., Wagner A.L., Mudatsir M. Coronavirus disease 2019 (COVID-19): A literature review. J. Infect. Public Health. 2020;13:667–673.
5. West R, Kobokovich A, Connell N, Gronvall GK. COVID-19 antibody tests: a valuable public health tool with limited relevance to individuals. Trends Microbiol. 2021;29(3):214–223. doi: 10.1016/j.tim.2020.11.002.