Tools based on nanotechnology for detecting individual viruses.

Annie Prins*

Department of Epidemiology and Clinical Research, University of New South Wales, Australia

Introduction

By providing answers to a broad variety of problems in numerous fields, the field of nanotechnology has transformed many facets of science and technology. Nanotechnology has facilitated the creation of state-of-the-art instruments for the identification and investigation of individual viruses in the field of healthcare and disease detection. These instruments offer a sensitivity and accuracy level that was not possible before. The use of nanotechnology to identify specific viruses will be discussed in this article, along with its possible implications for medical research and diagnostics [1, 2].

Nanoscale materials and structures—typically measured in nanometers, ranging from 1 to 100—are the focus of nanotechnology. Novel material behaviors and features appear at this size range, which makes them perfect for use in virology and other fields. The creation of virus detection techniques at the nanoscale could greatly improve our capacity to recognize and comprehend these pathogenic entities [3, 4].

The creation of Nano sensors is one of the most promising uses of nanotechnology in the detection of viruses. These tiny gadgets offer extremely sensitive and targeted detection capabilities by interacting with viruses at the molecular level. Specific virus proteins or genetic material can be recognized by Nano sensors, which enables the quick identification of individual viruses in clinical samples [5, 6].

When stimulated by outside light sources, semiconductor nanocrystals known as quantum dots release light with a particular color. They have been employed as fluorescent markers to monitor and identify specific viruses. It is possible for scientists to mark viruses in samples and make them readily visible under a microscope by tying quantum dots to antibodies or molecular probes. This technique can be applied to diagnostic procedures and allows for the real-time monitoring of viral interactions [7, 8].

Because of their special qualities, nanoparticles—like magnetic and gold nanoparticles—are useful for detecting viruses. In order to help isolate and identify viruses, functionalized nanoparticles can be employed to trap viruses or viral components. Furthermore, by serving as amplification instruments, nanoparticles might raise the sensitivity of detection techniques like polymerase chain reaction (PCR) [9, 10].

Conclusion

With the use of nanotechnology, we can now detect and analyze individual viruses with previously unheard-of sensitivity and precision, opening up new avenues for research in this area. These nanoscale instruments have the power to completely transform medical research, diagnosis, and the creation of new medications and vaccinations. We may anticipate even more cutting-edge uses of nanotechnology in the fight against infectious illnesses as technology develop, providing promise for a safer and healthier future.

References

1. Tiwari AK, Mishra A, Pandey G, et al. Nanotechnology: A Potential Weapon to Fight against COVID-19. Particle Syst Character. 2022;39(1):2100159.
2. Patra S, Kerry RG, Maurya GK, et al. Emerging molecular prospective of SARS-CoV-2: Feasible nanotechnology based detection and inhibition. Fronti Microbio. 2020;11:2098.
3. Santos BS, Cunha JL, Carvalho IC, et al. Nanotechnology meets immunology towards a rapid diagnosis solution: The COVID-19 outbreak challenge. RSC advanc. 2022;12(49):31711-28.
4. Filik H, Avan AA. Nanotechnology-based colorimetric approaches for pathogenic virus sensing: A review. Curren Medi Chem. 2022;29(15):2691-718.
5. Tavares JL, Cavalcanti ID, Santos Magalhães NS, et al. Nanotechnology and COVID-19: Quo vadis?. J Nanopar Res. 2022;24(3):62.
6. Singh R, Behera M, Kumari N, et al. Nanotechnology-based strategies for the management of COVID-19: recent developments and challenges. Curren Pharma Desi. 2021;27(41):4197-211.
7. Shen L, Wang P, Ke Y. DNA nanotechnology-based biosensors and therapeutics. Adva Health Mater. 2021;10(15):2002205.
8. Antiochia R. Nanobiosensors as new diagnostic tools for SARS, MERS and COVID-19: From past to perspectives. Microchimica Acta. 2020 Dec;187:1-3.
9. Kushwaha AK, Kalita H, Bhardwaj A, et al. Application of Nanotechnology in Detection and Prevention of COVID-19. 2020:361-95.

***Correspondence to:** Annie Prins, Department of Epidemiology and Clinical Research, University of New South Wales, Australia, E-mail: Prins@nie.au

***Received:** 24-Oct-2023, Manuscript No. AABPS-23-119399; **Editor assigned:** 28-Oct-2023, PreQC No.AABPS-23-119399(PQ); **Reviewed:** 10-Nov-2023, QC No. AABPS-23-119399; Revised: 15-Nov-2023, Manuscript No. AABPS-23-119399(R); Published: 22-Nov-2023, DOI:10.35841/aabps-13.102.203*

***Citation:** Prins A. Tools based on nanotechnology for detecting individual viruses. Asian J Biomed Pharmaceut Sci. 2023;13(102):203*

10. Palestino G, García-Silva I, González-Ortega O, et al. Can nanotechnology help in the fight against COVID-19?. Expert review of anti-infective therapy. 2020 Sep 1;18(9):849-64.