Recapping 2020’s Top Nanotechnologies for Life: Detecting COVID-19 Antibodies in10 Seconds Using Aerosol Jet 3D Printing

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Brand-new, fast and precise 19-covid virus detector provides 10-second assessable test for primary virus detection in blood droplet assisting nano-scale development techniques.

Global undesirable involvement in the 19-covid pandemic disaster arouses scientific society to an emergency vigilance for the world’s immediate salvation. As virus diagnosis is an essential preliminary stage for every suspected client, pandemic following researchers in Carnegie Mellon University and Pittsburgh University together have designed a precise easy-using electrode-based detector with the ability to detect the pico-molar concentration of virus in the client blood droplet as a result of utilizing aerosol jet 3D print technique.

In more details, electrodes are printed and gain reduced-graphene oxide (rGO) nano-flakes coating. Therefore, in the following steps, viral antigens get immobilized on the coating. Mentioned electrode preparation method and pursuing synthesis steps, lead to rough and irregular detection surface and provide a more extended area in nano-scale that consequently cause more antigen-antibody interactions which is the main reason for great accuracy of the described device. In fact, two main 19-covid antibodies referred as coV-2 spike S1 protein and receptor-binding domain (RBD) specifically react with antigens coated on the engineered surface and goes through the detection process resulting in considerable test selectivity.

The other fascinating feature of the designed device can be indicated as convenient attainment to result in assessment using smart devices such as smart mobile phones showing virus-related analysis in between 10 to 15 seconds. Moreover, instrument cleanness will be obtained rapidly by using prepared low-PH chemical material in 1 minute that washes antibodies from antigens and allows using the same sensor for other samples. In addition to being highly selective, precise, fast resulting and user-friendly, the low-priced preparation of

this device (around tens of dollars) makes it a reasonable choice for industrial-scale test tool production. It can be mentioned that the device designing roots were somehow in another project named "dopamine recognition" which changed to referred virus diagnosis by the Rual Panat research team at Carnegie Mellon University.

More details can be found in the complete article related to the described device which has been published and reported in the Advanced Material journal.

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