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Japan-based NEC to develop biosensor for detecting SARS-CoV-2 in open spaces

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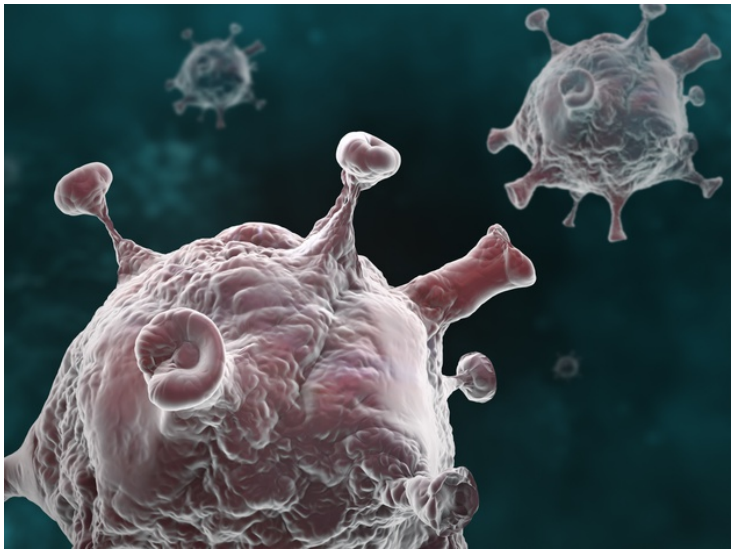
The effort promotes spatial monitoring at public places using a device that can identify spike protein of viruses through an artificial DNA Aptamer



Japan's NEC Corporation and NEC Solution Innovators announced the successful development of artificial DNA aptamers that bind to the novel coronavirus (SARS-CoV-2).

This breakthrough stems from the NEC Group's efforts to promote spatial monitoring business using aptamers, including the development of new biosensing systems, such as measuring equipment that can monitor spaces where various viruses, including SARS-CoV-2 and influenza viruses, are present.

The NEC Group is developing next-generation biosensors using an aptamer that can be stably produced in large quantities. The measuring device enables spatial monitoring of SARS-CoV-2 by combining MSSs (membrane-type Surface Stress Sensor) and an aptamer that binds to SARS-CoV-2. This measuring device is designed to be used in public spaces where people gather in close proximity.

SARS-CoV-2 enters into human cells when the spike protein, Receptor-Binding Domain (RBD), on the surface of the virus binds to the ACE2 receptors on the surface of human cells.

The aptamer developed by NEC Solution Innovators targets RBD, which is the key to infection, then traps the virus by recognizing the three-dimensional structure of the RBD and binding very strongly to it, a dissociation constant indicating the strength of the binding between molecules is less than 1nM).

This aptamer uses a new modified base called Base appended Base, which was developed by NEC Solution Innovators and Gunma University supported by a grant from the Japan Science and Technology Agency (JST). Binding assessment tests

were conducted using the Direct ELAA method, in which viruses were adsorbed onto plates and detected with enzyme-labeled aptamers.

Strong binding of aptamers to SARS-CoV-2 was observed in WK521 Wuhan strain, TY7-501 Brazilian, and QK002 UK strains.

In fiscal 2021, NEC expects to provide a prototype of fixed-type spatial monitoring measuring device for companies, universities and other research institutions. In addition, in fiscal 2022, NEC aims to provide a biosensing system that can be used for space monitoring and as an embedded device for equipment such as air conditioners. NEC Group plans to accelerate the development to facilitate the aptamers' potential as an antiviral drug.