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QUICK CHECK

REVOLUTIONARY DIAGNOSTICS TECHNOLOGY CAN RESHAPE THE STANDARD IN BIOSECURITY AND PANDEMIC THREAT IDENTIFICATION

The DxNA device enables airport personnel to test individual passengers and get results within 30 minutes

Natural and man-made public health threats of a biological nature are evolving at an increasing pace. What if airport security systems used thermal imaging to screen for persons with symptomatically elevated body temperatures for avian influenza, and then there was simple technology available that provided rapid diagnoses that could prevent cross-infection and a global pandemic? Imagine what such technology could do for international biosecurity. Fortunately that 'lab in a box' technology is here.

One of the most desired tools for detecting communicable disease among passengers is a simple-to-operate, point-of-care system for the analysis of DNA and RNA accurately and in detail. Keeping the need for biothreat prevention in travel hubs in mind, DxNA has developed a novel, integrated, closed polymerase chain reaction (PCR) system featuring a revolutionary portable device that can rapidly and accurately detect specific pieces of DNA and RNA genetic material. What separates DxNA from other diagnostic systems is exactly what airports require the most to meet the threats of bioterrorism and disease pandemics: a revolutionarily portable device, increased speed in generating results, and the elimination of the need for a clinical laboratory or medical professional to administer testing. This is a watershed development in public health.

DxNA is well-suited to assuring the biosecurity of travellers in airports and border surveillance systems due to the following:

- Simple one-button operation;
- Elimination of the need for specimen preservation or transportation;
- Remote data transmission, data storage and screen display.

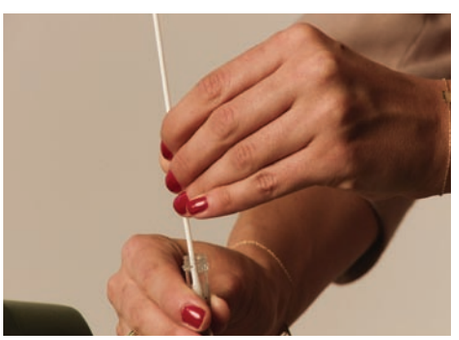
Bioterrorist threats such as anthrax and the emergence of high-profile diseases like severe acute respiratory syndrome (SARS) and highly pathogenic avian influenza underscore a pressing need for rapid, portable detection methods simple enough for use anywhere, indoors and outdoors. DxNA takes DNA and RNA analyses away from the special, well-accoutred laboratories required for current methods and makes determinations rapidly and easily by almost anybody.

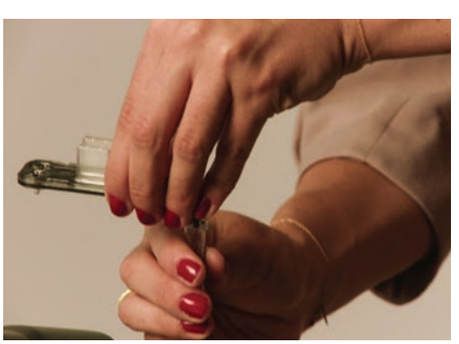
Designed with economy in mind, the DxNA system is less costly than the PCR devices typically found in cumbersome units in clinical laboratories. PCR is what the portable DxNA analytical system does, but in less than one hour from sample acquisition to a reportable result instead of the several hours typical of laboratory-based PCR technologies. PCR can detect DNA unique to an individual or species by copying small, specific pieces of DNA from its target. Beginning with a single molecule, PCR can generate billions of similar DNA pieces, enough to become easily identified and analysed. DxNA detects amplified DNA as it accumulates in the reaction – i.e., as copies are made during each amplification cycle.

Early detection is essential for optimally managing or treating infectious and genetic diseases and, in that regard, molecular-based

detection technologies have proved invaluable. Bioterrorist threats such as anthrax and the more recent emergence of high-profile diseases like Severe Acute Respiratory Syndrome (SARS) and Highly Pathogenic Avian Influenza underscore a pressing need for rapid, portable detection methods simple enough for use anywhere.

With other technology, suspect samples are still sent to distant laboratories, entailing hours or days of lost opportunity and





passenger inconvenience. This gross lack of expediency can make for clinical and public health decisions that are inappropriate or compromised. An intentional biological attack on humans could prove a serious health threat, and one on livestock might shut down markets that are worth many billions of dollars. Detecting agents of bioterrorism at the earliest possible time makes for successful prophylactic and therapeutic treatments, and minimises the chances for pathogen transmission. Preventing the boarding of such passengers onto aircraft helps to eliminate the threat of transmission among passengers.

Tests should be portable, and ease-of-use would reduce the need for highly trained personnel. These tests should also have a capacity for rapid modification to keep up with the ongoing genetic changes typical of all influenza viruses. The DxNA system can be readily used for avian influenza surveillance, screening and diagnosis. Rapid testing to detect avian influenza as early as possible and containment will be an essential defence against an avian influenza pandemic.

Many major airports, in response to the SARS epidemic and in the face of a potential avian influenza pandemic, use thermal imaging on incoming passengers as a first line of defence. Passengers who have elevated temperatures are segregated for further tests to accurately determine whether they are infected with certain diseases. That test must be done on-site, at the airport. The most accurate, sensitive and reliable test at that point is PCR. DxNA technology serves this need better than any other device for the following reasons:

• The device is closed system. This provides an incredible benefit over other PCR devices that require the operator to have considerable competence. Competing products require complex sample preparation steps before submitting the sample to be tested. Each of those steps carries with it the potential, particularly in an environment like an airport, to actually make the problem worse by spreading the disease out to the atmosphere. However in the DxNA device, after the sample is entered into the system every step is done in a sealed cartridge.

• The device quickly tests individual samples, which is ideal for scanning specific passengers within the airport security infrastructure. Many PCR devices on the market are designed for research work and require 48 or 96 samples. They would essentially require airport authorities to detain people until a sufficient sample was gathered, wasting precious hours of productivity and imposing enormous inconvenience on travellers. The DxNA device enables airport personnel to test individual passengers and have results within 30 minutes.

• DxNA is small and can be easily transported. It is about the size of a toaster.

• DxNA is cost effective. Because the system is so simple to use, airports would not need to hire special personnel to run the tests. Security employees can be taught to use the DxNA device in minutes.

These advantages would save valuable minutes, hours or even days when responding to a potential biothreat. Airport executives need to have the capability to respond quickly and make fast decisions about whether to keep the airport open in the face of an unknown threat. DxNA enables the analyser to be transported to the sample and have a reliable answer in minutes without exposing other individuals to a threat. Before a potential threat could be collected and taken to a lab, the DxNA device would already have the answer.

For more information

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