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Japan Science and Technology Agency (JST) Tel: 3-5214-8404 (Public Relations Section)

Nippon Sheet Glass Co., Ltd. Tel: 03-5443-9477 (Corporate Communications)

National Institute of Advanced Industrial Science and Technology Tel:029-862-6216 (Press Room)

Joint Team Develops Rapid Mobile DNA Testing Equipment

Detects bacteria and virus onsite in 10 minutes

- Rapid, compact, lightweight DNA testing equipment (real-time PCR equipment)
- Cuts testing time from 60 to about 10 minutes
- With battery, enables testing anywhere

TOKYO, February 8, 2017 -- As part of JST Development of Advanced Measurement and Analysis Systems Program, a joint development team of Nippon Sheet Glass Co., Ltd. (NSG), National Institute of Advanced Industrial Science and Technology (AIST), and Go!Foton, Inc. has successfully developed the rapid, compact, lightweight real-time PCR equipment¹⁾(mobile DNA testing equipment).

The conventional equipment available for DNA testing (nucleic acid amplification testing) of bacteria and virus are precise and useful but the long processing time, large size and high cost have limited their use to specialized laboratories. On the other hand, there has been an increasing need for the DNA testing equipment capable of onsite use for early containment of spreading infection.

With the combination of AIST technology to amplify the target bacteria or virus genes on a small plastic substrate at high speed and NSG's proprietary compact fluorescence detector capable of measuring the amount of genes with high sensitivity, the joint team has successfully miniaturized the DNA testing equipment while maintaining high precision and shortening the processing time.

The new mobile DNA testing equipment can be hand-held due to its small size (about 200 mm x 100 mm x 50 mm in dimension) and light weight (about 500 g). Processing time for testing has been shortened to about 10 minutes²⁾ compared to one hour with the conventional equipment. In addition, lower cost and battery operation were made possible by its compact size.

With the new equipment, accurate DNA testing, which was previously possible only with a stationary equipment in specialized facilities, can now be performed virtually

anywhere. As this new equipment can quickly identify common virus (influenza, Noro etc.) and bacteria (O157, etc.) on the spot, it might be used in a variety of situations, including the inspection of food processing plants, environmental contamination surveys and quarantine at airports and harbors as well as in hospitals and other medical sites. The equipment is currently under development by NSG for a launch by the end of this year.

NOTE:

- 1) Real time PCR equipment can specifically amplify target DNA and measure its amount in real time using the polymerase chain reaction method. In the polymerase chain reaction method, a specific part of DNA is amplified by reciprocating it between two or three higher/lower temperature regions. Since even a tiny amount of DNA can be amplified, this method is indispensable in genetic engineering research.

- 2) About 10 minutes
Measurement time of the testing equipment when used in combination with a high-speed PCR reagent. The time for pretreatment is not included.