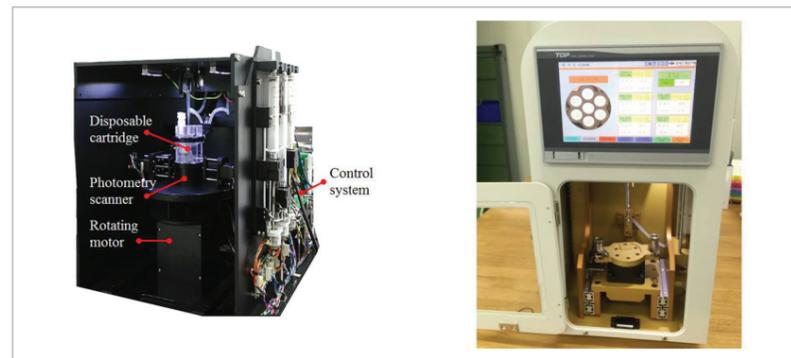


On-site Diagnostic Molecular Diagnosis Apparatus

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⇒ All-in-one molecular diagnosis cartridges and analysis equipment technology allowing for quick on-site diagnosis of infectious disease (swine flu, MERS, STD) by a semi-professional



Client / Market

- In Vitro diagnostic, molecular diagnosis market

Necessity of this Technology

- The occasions calling for quick diagnosis due to the emergence of new virus diseases are increasing, and the demand for the DNA test for disease prevention has increased.
- The DNA test for detecting virus mostly uses the PCR method or isothermal amplification, so the test is conducted with an electrophoresis tool or a real-time PCR machine. However, out of the necessity at the field, a simpler, automated DNA test is demanded.
- A lot of time is consumed for pre-treatment of a specimen, mixing of a specimen and a reagent, and the residue treatment. And the existing specimen pre-treatment device has a complex structure with high production cost and consumable expenses. While treating a large amount of specimens at once, the specimen could possibly be contaminated.

Technical Differentiation

- It is mechanically simple and effectively handles the specimen pre-treatment.
- It automatizes the entire process - nucleic acid extraction, amplification and detection

DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other



TECHNOLOGY READINESS LEVEL [TRL]

Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

- Nucleic acid extraction is easy. (30 minutes, 60 to 90 minutes for testing)
- It includes the chambers that store reagents to be mixed with the specimen, and the reagents are connected to the specimen pre-treatment device, where specimens are discharged from each chamber in order according to the pre-treatment process order. This simplifies the pre-treatment device and integrates the nucleic acid amplification and detection device, which the nucleic acids extracted from the specimen flow in.

Process Order	Component/Process	Additional Explanation
Nucleic acid extraction	Modify disposable cartridge and joint design Optimize cartridge driving module	Nucleic acid extraction time < 30 min. *May differ depending on the test subject and item
Nucleic acid amplification	Precise temperature control (heating/cooling) module Prototype modification	Nucleic acid amplification, detection time < 30 min *May differ depending on the test subject and item
Nucleic acid detection		
Diagnosis analysis	Integrated system for nucleic acid extraction, amplification, and detection and control and analysis assessment	Target test time < 40 to 60 min

Excellence of Technology

- Prototype process chart
- Through the internal research project and the government-trusted assignment, the prototype for the fully automatic nucleic acid extraction with the all-in-one cartridge and the single channel isothermal (61 degree) amplification and detection was produced and its performance was verified.
- The basic system for multiplexing PCR through multichannel optical modules was completed.

Current Intellectual Property Right Status

PATENT

- Sample Preparation Device (KR1244467)
- CN201110428842.3)
- Device for Automatically Analyzing Nucleic Acid and Opening and Closing Device Thereof (KR1487537)
- A Cartridge for Automatically Analyzing a Nucleic Acid (KR1512161)
- Cartridge for Sample Preparation (KR1630784)
- Cartridge for Sample Preparation and Collected Acid Analysis (KR1703992)