

DEVELOPMENT OF PORTABLE AND RAPID HUMAN DNA ANALYSIS SYSTEM AIMING ON-SITE SCREENING

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We have developed a portable and rapid human DNA analysis system that is based on micro-fabricated capillary electrophoresis (mCE) installed in the suitcase.

This system utilizes the following technologies: first, balloon-chip technology, which makes it possible to manufacture a disposable chip, manufactured by bonding several art-worked silicon-elastomer films; second, technology that is used to manipulate micro fluid accurately without using a syringe pump; third, specially designed reagent ampoule, which eliminates necessity for pipette; fourth, PowerPlexTM S5 System, which is very useful for screening purpose; fifth, a high-speed PCR for micro fluid scale; sixth, small size spectrometer for multi-color detection; and seventh, an electrophoresis analysis program.

The system operates with 12 volts and is installed in an suitcase, and can be used to carry out DNA extraction, polymerase chain reaction (PCR), and eight microchannel capillary electrophoresis (mCE) in four, twenty, and six minutes respectively, thirty minutes in total.

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