Pilot Gene Technology Digital PCR Platform and Application

Technical Principle

The first-generation:

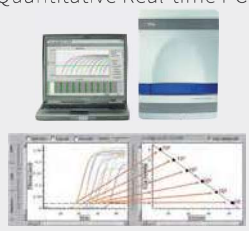
Ordinary PCR

The third-generation:Digital PCR

Automated Digital PCR System AD 3207

The second-generation:

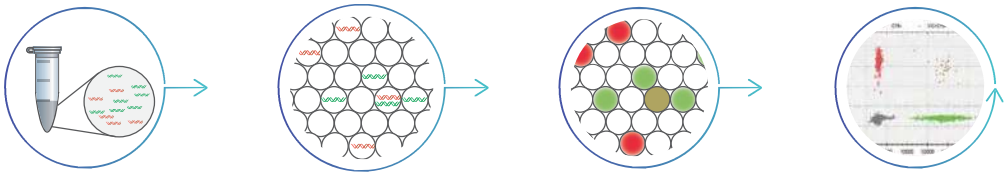
Quantitative Real-time PCR



Digital PCR (dPCR) is the third generation of PCR that enables precise, highly sensitive quantification of nucleic acids. It works by dividing a reaction mixture into numerous individual reactions called partitions and then measuring the endpoint fluorescence of each partition to determine the presence or absence of the target. Statistical methods (Poisson distribution) are then used to calculate the absolute concentration of the target based on the number of positive and negative partitions.

The basic operation of dPCR consists of four steps: sample preparation, droplet generation, nucleic acid amplification and data analysis.

dPCR uses advanced microfluidics technology to achieve partitioning on a massive scale, generating 30,000 highly uniform droplets per sample. The individual droplets are partitioned into identical sizes(each its own reaction compartment)before PCR. PCR then amplifies the fluorescent target in the droplets. The result is the accurate and precise quantification of multiple targets in a single reaction.



Sample preparation | Droplet generation | Nucleic acid amplification | Data analysis

Technical benefits of dPCR

Absolute quantification

Independent of standard curves

High sensitivity

Unimolecular detection realized

High stability

Inhibitor tolerance, apply to complex samples

AP10 Automated Nucleic Acid Detection Reaction Construction System

Pilot Gene Automated Nucleic Acid Detection Reaction Construction System consists of three parts, using the magnetic bead method to extract and purify nucleic acid, construct a PCR reaction system, and transfer the liquid to the chip. It is a fully automatic instrument for digital PCR preprocessing. It has the advantages of high automation, fast extraction speed, accurate sample addition, stable system and open platform.

Automation

Fully automated sample pre-processing to avoid manual errors, good repeatability

Anti-contamination

UV disinfection to reduce contamination of samples between batches

High performance

Optimised extraction protocols for high purity and yield

Openness

Applicable to a variety of magnetic bead-based extraction solutions

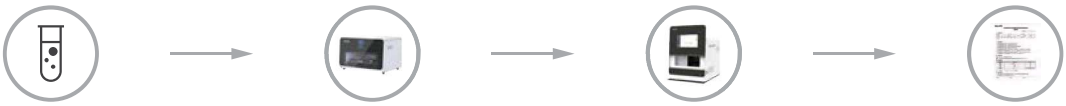
Safety

Intelligent operation, avoiding exposure to toxic material

Multipurpose

It can realize various purposes such as nucleic acid extraction and purification, PCR reaction system construction, sample mixing and automated sample loading.

✓ Automated Nucleic Acid Detection Reaction Construction System(AP10) + Automated Digital PCR System



Automated Digital PCR System AD 3207

Original R&D

Fast time to results

Up to 7 fluorescent channels

The seven-channel Automated Digital PCR System AD 3207 integrates droplet generation, PCR amplification, and multi-channel fluorescence detection & analysis. It takes only 3 hours from chip loading to result output, truly realizing walk-away operation. It has the unique advantages of high efficiency, convenience, multiple detection, and excellent performance.

All-in-one desktop platform

Fully automatic instrument

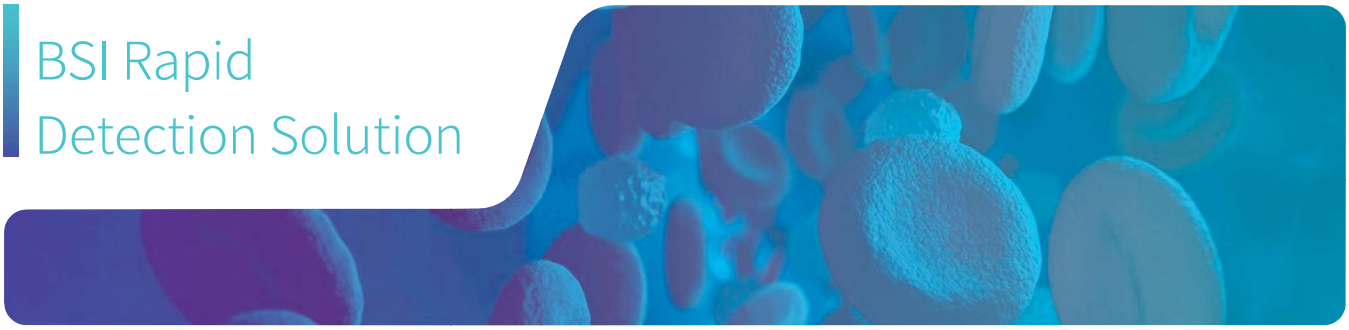
7 fluorescent channels

TAT：3 hours

Experimental procedure

Nucleic acid extraction → Chip loading → AD 3207 → Report output

BSI Rapid Detection Solution



BSI

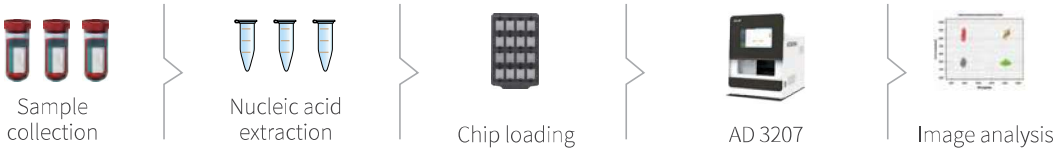
Bloodstream Infections (BSI) is a systemic infectious disease caused by bacteria, fungi and other pathogens invading the bloodstream.The detection of pathogenic bacteria in BSI can be classified into three categories: Blood culture-based microbiological detection of pathogens, blood culture-based molecular detection, and direct molecular tests in blood.

Blood culture limitations

- Long turnaround time
  Low positive rates
- Single species bacteria detected
  Easy to contaminate
- Large amount of blood collection
  Complex operation

detection solution

ddPCR detection solution 3h



Key Benefits

High rapidity and efficient
It only takes 3 hours from chip loading to report output, which truly meets the needs of clinical departments for rapid pathogenic detectior results

TAT: 3 hours

Dynamic monitoring
Dynamic monitoring of changes in pathogenic microorganism species and levels to guide clinical protocol development and adjustment.

High positive rate
Compared with blood culture, the consistency >90% and the positive rate increased by more than 200%.
(30% vs 10%)

↑ 200%

Little sample required
Only 2-5 mL peripheral blood is required, compatible with different clinical samples such as cerebrospinal fluid, hydrothorax and ascites.

2~5mL