

LabDisk for sample-to-answer detection of neonatal sepsis pathogens

Fully automated multiplex detection

Hahn-Schickard developed an integrated and fully automated LabDisk for rapid and highly sensitive molecular diagnostic-based detection of bacterial pathogens associated with neonatal sepsis.

Neonatal sepsis is a major cause of infant death worldwide. Conventional diagnosis on the basis of phenotypic cultures may require several days until conclusive bacterial identification results are available, impeding rapid and evidence-based antimicrobial treatment. Rapid diagnosis can principally be realized by molecular diagnostics test formats e.g. polymerase chain reaction (PCR), however cumbersome workflows and complex instrumentation is required.

The LabDisk enables easy-to-use PCR-based detection of 11 bacterial pathogens associated with neonatal sepsis in a small, portable analyzer, the "LabDisk player". Highly sensitive detection down to the single bacteria range (2 colony-forming units per sample demonstrated for *Haemophilus Influenzae*) is enabled by two successive PCR amplifications steps (nested PCR). With dimensions of

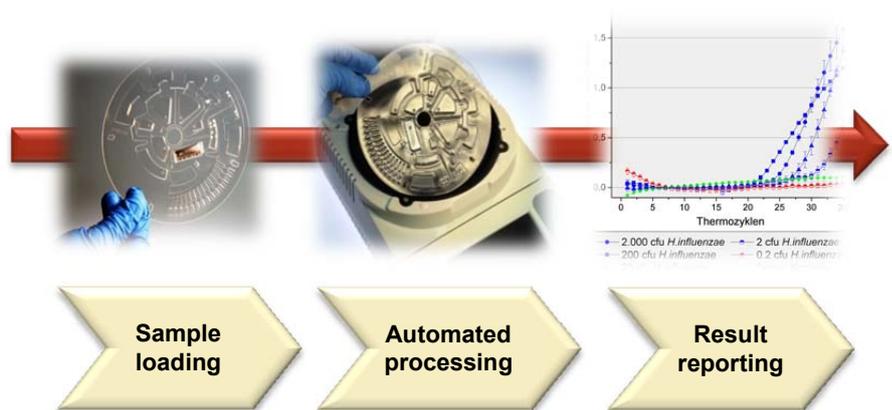


Fig. 1: LabDisk workflow for sample-to-answer multiplex detection of bacterial pathogens. Further reading: G. Cziliwik et al., *Lab Chip*, 2015, 15, 3749-3759

LabDisk: Characteristics

- Fully automated sample-to-answer process including sample preparation and nested-PCR
- High sensitivity. Detection down to 2 colony-forming units (CFU) of bacteria in 200 μ L blood serum
- Multiplex detection of 11 bacterial pathogens
- Time to result: 3 hrs 45 min. (vs. 1-2 days for culture-based identification)
- Ease of use for non-experts with only 5 min. hands-on time
- Automation in analyzer suitable for point-of-care applications

28x18x15 cm³, the LabDisk player conducts specific centrifugal processing protocols, fluorescence signal acquisition and PCR thermocycling. All reagents that are required for the PCR amplifications are already pre-stored on the LabDisk, thus only an initial pipetting step of the serum

sample and the DNA extraction buffers is necessary, which requires 5 minutes hands-on. The LabDisk provides an easy-to-use molecular diagnostic platform for rapid, highly-sensitive detection of bacterial pathogens without the need for complex laboratory instrumentation.