



Laboratory Medicine in the Era of Disruptive Technology

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## **Ongoing revolution in clinical microbiology: current status and future perspectives**

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The clinical microbiology laboratory is in the midst of a diagnostic revolution. New diagnostic technologies and approaches have already transformed the modern microbiology laboratory and the care of patients with suspected infections by providing more rapid, clinically relevant and robust microbiological diagnoses.

The following technologies and approaches which changed or are expected to change clinical microbiology will be reviewed: molecular diagnostic methods, MALDI-TOF mass spectrometry, total laboratory automation in bacteriology, syndrome-specific testing, point-of-care testing and 24/7 concept, digital PCR, next-generation diagnostic sequencing, next-generation antimicrobial susceptibility testing, CRISPR-Cas-based diagnostic assays and numerous non-microorganism detection based diagnostic approaches.

However, technological advances come with practical challenges for the laboratory and for clinicians. Although new diagnostic technologies enable expedited accurate microbiological diagnoses, diagnostic stewardship and antimicrobial stewardship are necessary to ensure that these technologies conserve, rather than consume, additional health care resources and optimally affect patient care. Diagnostic stewardship is needed to implement appropriate tests for the clinical setting and to direct testing toward appropriate patients. Antimicrobial stewardship is needed to ensure prompt appropriate clinical action to translate faster diagnostic test results in the laboratory into improved outcomes at the bedside