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Advances in Point-of-Care Technologies for Molecular Diagnostics

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Abstract

Advances in miniaturization, nanotechnology, and microfluidics, along with developments in cloud-connected point-of-care (POC) diagnostics technologies are pushing the frontiers of POC devices toward low-cost, user-friendly, and enhanced sensitivity molecular-level diagnostics. The combination of various bio-sensing platforms within smartphone-integrated electronic readers provides accurate on-site and on-time diagnostics based on various types of chemical and biological targets. Further, 3D printing technology shows a huge potential toward fabrication and improving the performance of POC devices. Integration of skin-like flexible sensors with wireless communication technology creates a unique opportunity for continuous, real-time monitoring of patients for both preventative healthcare and during disease outbreaks. Here, we review recent developments and advances in POC technologies and describe how these advances enhance the performance of POC platforms. Also, this review describes challenges, directions, and future trends on application of emerging technologies in POC diagnostics.

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