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Yunlei Xianyu, Qiaoling Wang, Yiping Chen

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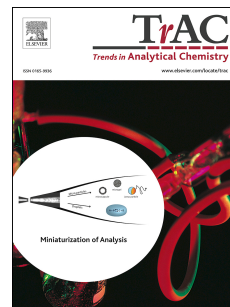
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Magnetic particles-enabled biosensors for point-of-care testing

Yunlei Xianyu^{‡#}, Qiaoling Wang^{&#}, Yiping Chen^{‡*}

[‡] CAS Center for Excellence in Nanoscience, CAS Key Lab for Biological Effects of Nanomaterials and Nanosafety, National Center for NanoScience and Technology, Beijing, 100190, P. R. China

[&]Yantai City Hospital for Infectious Diseases, Yantai, 264001, Shandong, P.R. China.

Email: chenyp@nanoctr.cn

[#] These authors contribute to this work equally.

Abstract

Point-of-care testing (POCT) for early diagnosis and personalized treatment in clinics plays an increasingly important role in controlling the outbreak of disease and improving the survival rate of patients. Magnetic particles (MPs) have emerged as promising candidates for developing biosensors for POCT. This review outlines the mechanisms of assaying biomarkers by MPs, and discusses recent advances in MPs-implemented biosensors with enhanced performance and reduced complexity. Portable and automated instruments for device operation and signal readout are included for the practical applications of MPs-combined biosensors for easy, reliable, and cost-effective point-of-care diagnostics.

Key words Magnetic particle, biosensor, point-of-care testing, signal amplification, biomedical diagnosis

1. Introduction

It is becoming widely recognized that the early diagnosis and personalized treatment in clinics play an increasingly important role in controlling the outbreak of disease and improving the survival rate of patients. In backward countries or even developing countries, however, most healthcare centers where patients are treated still have limited access to laboratory tests. Accordingly, much effort has been spared on the development of *in vitro* diagnosis to move toward the goal of point-of-care testing (POCT) that can be conducted at the bed site of patients. POCT enables rapid diagnosis of diseases without the requirement for professional personnel and laboratory instrument, which may revolutionize the current status of global health. Current clinical diagnosis relies on techniques such as enzyme-linked

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