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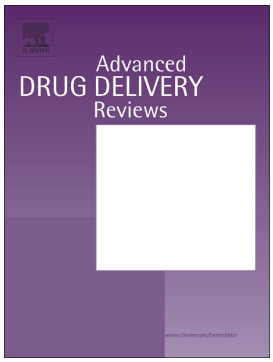

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Nanoplasmonic Sensors for Detecting Circulating Cancer Biomarkers

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Abstract

The detection of cancer biomarkers represents an important aspect of cancer diagnosis and prognosis. Recently, the concept of liquid biopsy has been introduced whereby diagnosis and prognosis are performed by means of analyzing biological fluids obtained from patients to detect and quantify circulating cancer biomarkers. Unlike conventional biopsy whereby primary tumor cells are analyzed, liquid biopsy enables the detection of a wide variety of circulating cancer biomarkers, including microRNA (miRNA), circulating tumor DNA (ctDNA), proteins, exosomes and circulating tumor cells (CTCs). Among the various techniques that have been developed to detect circulating cancer biomarkers, nanoplasmonic sensors represent a promising measurement approach due to high sensitivity and specificity as well as ease of instrumentation and operation. In this review, we discuss the relevance and applicability of three different categories of nanoplasmonic sensing techniques, namely surface plasmon resonance (SPR), localized surface plasmon resonance (LSPR) and surface-enhanced Raman scattering (SERS), for the detection of different classes of circulating cancer biomarkers.

Keywords: circulating tumor cells; microRNA; circulating tumor DNA; exosomes; nanoplasmonics; SERS; LSPR