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A Review of Aptamer-Based Surface-Enhanced Raman Scattering (SERS) Platforms for Cancer Diagnosis Applications

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Abstract

Traditional cancer detection methods have many drawbacks despite the fact that early cancer diagnosis is crucial for efficient treatment and improved patient outcomes. Surface-enhanced Raman spectroscopy (SERS) and aptamer-based biosensors have emerged as potential solutions to these problems. Aptamer-based SERS biosensors provide rapid, sensitive, non-invasive early cancer diagnosis by detecting cancer biomarkers at very low concentrations. This review examines the significant studies that have produced aptamer-based SERS systems for the early detection of various cancers. The review starts with an exhaustive examination of the literature, showcasing the significant findings in a tabular format. The advantages of this approach are then discussed, including how versatile it is in dealing with a range of compounds that are particular to cancer, and some directions for further study are suggested. The research demonstrates how aptamer-based SERS biosensors might revolutionize early cancer detection, enhance therapeutic outcomes, and reduce healthcare costs.