Title: Pioneering biosensor approaches for oral squamous cell carcinoma diagnosis: A comprehensive review

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Abstract: Oral squamous cell carcinoma (OSCC) remains a significant global challenge in the medical field, accounting for approximately 300,000 incidences and 145,000 mortalities annually. Studies suggest that early cancer detection is the most vital factor in improving OSCC patient outcomes. Effective clinical diagnosis methods for early OSCC are needed urgently. OSCC biomarkers are identified to be associated with cancer progression and biosensors are devices developed to detect the presence of OSCC biomarkers to allow early cancer diagnosis. Biosensor technology has significant potential in providing rapid and accurate detection of OSCC biomarkers with high sensitivity and specificity. Biosensors have various advantages compared to conventional diagnostic methods such as being non-invasive, low-cost, and convenient. Biosensors hold the potential to be adopted as point-of-care-testing (POCT) devices by bringing biosensor technology to the patients. This review aims to provide a comprehensive review by describing and comparing different categories of OSCC biosensors based on their advantages and drawbacks. The recent obstacles and opportunities for developing effective biosensors for cancer diagnosis are summarized.

Keywords: Oral squamous cell carcinoma (OSCC), Early cancer detection, Biomarkers Biosensors, Clinical diagnosis, Diagnostic technologies

DOI: https://doi.org/10.1016/j.procbio.2024.02.015

https://www.sciencedirect.com/science/article/abs/pii/S1359511324000692