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**REVIEW ARTICLE**

# Recent Advances in Electrochemical Biosensors Targeting Stress Markers

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**Abstract:** ***Introduction*:** When the body experiences a change in its internal environment due to factors such as mood (euphoria, stress) and illness, it releases biomarkers in large quantities. These biomarkers are used for detecting a disease at its early stages. This involves the detection of insufficient quantities of biocomponents, which can be done by using nanomaterials, conventional materials, and biotechnology; thus, scientists can increase the sensitivity of electrochemical sensors. According to studies conducted in this area, electrochemical sensors have shown promise as a diagnostic tool due to their ability to identify and pinpoint illness biomarkers. The present review article was compiled to gather the latest information on electrochemical biosensors targeting stress markers.

***Materials and Methods*:** The authors searched scholarly databases like ScienceDirect, Pubmed, Medline, and Scopus for information on electrochemical biosensors targeting stress markers.

***Results*:** In this article, we looked at the recent developments in electrochemical sensors for stress monitoring. Because of advances in nanomaterial and biomolecule processes, electrochemical biosensors have been developed with the sensitivity to detect several biomarkers in real-time in therapeutically relevant materials.

***Conclusion*:** This biomarker sensor strategy can analyze various biofluids (sweat, plasma, urine, and saliva).

**Keywords:** stress biomarkers, sensors, blood, point-of-use, urine, saliva, sweat.

## 1. INTRODUCTION

In many ways, the advancement of science, technology, and industry has greatly improved humanity. However, as human life expectancy keeps increasing, the rising incidence of age-related diseases presents a serious challenge to contemporary society [1]. The condition determines the number of antibodies, hormones, or proteins secreted into the blood. Infections may be indicated by biomarkers, which can be any substances, including DNA, RNA, metabolites, proteins, and protein fragments [2-4]. Biochemical development has resulted in a broader definition of a biomarker, which now encompasses anything from low-molecular-weight things [5-8]. Blood glucose, essential in diagnosing diabetes, is the earliest and most well-known biomarker in medical diagnostic and pharmaceutical research [9-11]. Recent years have seen the use of biomarkers for early diagnosis, treatment response exploration, and therapeutic benefits evaluation [12]. Biosensors for early illness diagnosis are being developed to identify biomarkers that can give high sensitivity and selectivity [13-15].

By preventing diseases in their early stages, patients can avoid the heavy cost burden of treating them later. A clinically usable disease diagnosis sensor should have excellent reliability, sensitivity, and reproducibility, be low cost, and be easily accessible. Therefore, it is essential to quantify biological and metabolic processes for use in medicine and the life sciences [16]. Electrochemical biosensors can convert a biological sample into a clear electrical signal. Due to electrochemical signal-based biosensor technology, the diagnostic equipment is very efficient, and only a tiny sample is required for detection and analysis. It can be used in many fields, such as medicine, toxicology, food security, and ecology [17]. Limitations in sensitivity, selectivity numbers, and the need for a strong acid or perchlorate environment to allow electron transport are all inherited and contribute to the limited scope of applicability to electrochemical sensors.

Quantitative and qualitative measurements of biomarkers can be used to track stress levels throughout time. Acute Phase Proteins (APPs), heat shock proteins (HSPs), oxidative stress markers, and chemical discharges in saliva and

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