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# Whole Blood NADH Monitoring Using Biodegradable Electrocatalytic Sensor

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## INTRODUCTION

In the study, the preparation and electrochemical characterization of screenprinted electrodes (SPE) modified with 4mercaptoNphenylquinone diamine (NPQD) and their behavior as electrocatalysts toward the oxidation of NADH with high stability are described. In particular, NPQD on the SPE substrate was deposited via electropolymerization. In all cases, NADH oxidation occurred at potentials approximately corresponding to 0.7 V vs Ag/AgCl electrode, and this indicates a decrease in the overpotential. We used the observations as a point of departure and developed an NADH biosensor based on the electrocatalytic oxidation of NADH. The applicability of the NADH sensor was demonstrated for the first time in selectivity/sensitivity test via complex electrolyte as cell culture inflammatory and fibrotic responses by polyhexamethylene guanidine phosphate via NADH sensing in mouse serum. The maintenance of mitochondrial function is critical to preserving homeostasis in the living cell. Mitochondria are the cornerstone of lifesupporting metabolic processes such as energy transduction and calcium signaling in biosynthetic pathways.

## DESCRIPTION

Nicotinamide adenine dinucleotide, nicotinamide dinucleotide phosphate (NADP), and flavin adenine dinucleotide (FAD) are the most important coenzymes that exhibit a beneficial effect on the mitochondrial state because ATP production depends on the redox state of these coenzymes. Among them, NADH is the most wellknown biomarker of the redox state of a cell. Koidl group reported that NADH deficiency causes an energy production problem and induces Parkinson`s disease due to the lack of ATP. The conventional method to determine NADH corresponds to an optical assay using absorbance4 or fluorescence and a colorimeter. The aforementioned methods are robust and standardized analytical methods to determine NADH. They also require high maintenance costs and high sample volume, and they exhibit a low limit of detection (LOD). Electrochemical (EC) biosensors for NADH emerged as an alternative analytical tool to conventional methods. The EC biosensor exhibits several advantages including convenience and short analysis time, and they require a small sample volume while maintaining high sensitivity and selectivity.. However, there were some restrictions. In other words, there is great potential to oxidize NADH. This destroys the electrode surface due to the fouling effect and reduces efficiency. This is because the redox reaction easily forms NAD + on the electrode surface at the beginning of development.

## CONCLUSION

To solve the problem, a single mediator K3Fe (CN), polymer, using different sensor configurations using an electrode-catalyzed enzymatic reaction induced by surface modification to lower the redox potential of NADH. Several studies have been done. While each method has significant advantages, the development of fast, inexpensive, and accurate methods to maintain sensitivity remains important in the field of NADH-EC sensors. Shown is a screen-printed cathode (SPE) based biosensor with an anode impetus immobilized on the SPE by surface adjustment to bring down the redox capability of the NADH/NAD + couple. SPE is a promising insightful apparatus as a minimal expense NADH biosensor stage. Also, we concentrated on terminal catalyzed responses in complex media and demonstrated that the proposed sensor keeps up with its responsiveness by decreasing the impedance signal.

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