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Characteristics of an Enzyme Immunomicrosensor Based on an ISFET for Hepatitis B Surface

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The potentiometric response of an enzyme immuno-ISFET sensor for hepatitis B surface (HBs) was studied. The enzyme immuno-ISFET sensor was constructed using an immobilized HBs-antigen membrane and an ISFET. The assay procedure involves the competitive immunochemical reaction of urease-labeled anti-HBs horse IgG with HBs in samples and the membrane-bound HBs and the electrochemical determination of membrane-bound urease activity. A linear relationship was obtained between the initial rate of response and the logarithm of HBs concentrations from 0.01 to 0.75 μg/ml. The assay was found to be suitable for an enzyme-linked immunoassay using urease as the marker enzyme.

1. Introduction

In recent years, immunoassay procedures such as radioimmunoassay (RIA) and fluoroimmunoassay (FIA) have become the most widely used methods in immunochemistry, taking the place of immune adherence hemagglutination (IAHA), reversed passive hemagglutination (RPHA), and enzyme immunoassay (EIA). However, as RIA requires specific equipment and special handling techniques, highly sensitive but nonisotopic immunochemical methods, such as EIA, FIA and electrochemical immunoassay, have been examined extensively.[1–3] There is a need for a simpler, safe and inexpensive methodology which preserves the sensitivities and selectivities currently available with RIA. Many sensors consisting of bioactive substances and electrochemical devices have been developed for clinical screening, immunological analysis, environmental control, etc.[4–7] A number of examples of