

Preparation of Needle Type Glucose Sensors Using γ -Polyglutamic Acid as an Enzyme-Immobilizing Substrate

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The importance of glucose determinations for the diagnosis and effective treatment of diabetes has been well recognized. Therefore, a large number of efforts have been devoted to make an effective sensor for a continuous estimation of glucose concentration in subcutaneous tissue [1-3]. Typical implantable enzyme immobilized glucose sensors are composed of three layered films. 1) Inner layer film for permselective transportation in order to eliminate the influence of electroactive species exist in biological media ion (mainly ascorbic acid, uric acid and acetaminophen), 2) enzyme-immobilized layer and 3) outer layer for the elimination of protein adsorption that occur immediately when the sensors are inserted in the biological media. Negatively charged polymers like Nafion are commonly used as effectively inner layer permselective film. On the other hand, bovine serum albumin (BSA) is a popular material for the immobilization of enzyme. In this study, Meanwhile, γ -polyglutamic acid (PGA) is a water-soluble dietary fiber, which is known as the sticky paste formed on the surface of fermented soybeans "Natto". It is also non toxic towards humans and the environment. Since PGA is negatively charged polyamino acid, it can be expected to be suitable inner layer permselective film material. Moreover, the functional group of PGA, carboxyl group can be applied to interact with enzyme in order to immobilize it firmly stable. In this study, PGA was introduced as a sensor fabrication material.

The function of PGA as a permselective film and enzyme-immobilizing substrate was evaluated in phosphate buffer solution. The performance of the electrode in horse serum sample was also measured.

References

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