

Construction Of Automated Biological Fluid Glucose Measuring System

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Introduction

The recognition and constant maintenance of blood glucose at standard level is importance for the diagnosis and health control. Therefore, diabetes needs to do painful blood glucose measurement several times a day. Although the glucose level of urine is not exactly proportional to the blood glucose, it will give considerable information of it. The measurement of urine is not painful and may improve the "Quality of Life" of the patient. Moreover, the measuring system can be simply with more freedom with the material and construction since the measurement will not include any medical action. In this study, glucose measuring system of biological fluid was designed and constructed. The evaluation of the system was performed using human urine.

Experimental

Figure 1 shows the schematic diagram of the glucose measuring system. The glucose sample will be added with glucose oxidase and injected to the flow sensing system. In order to eliminate the contamination of protein in the mixer of urine sample and enzyme, the electrode component was divided with permselective membrane. The urine sample was also diluted to lower the possibility to contaminate the system. The response was obtained by measuring the oxidation current of hydrogen peroxide produced by the enzyme reaction.

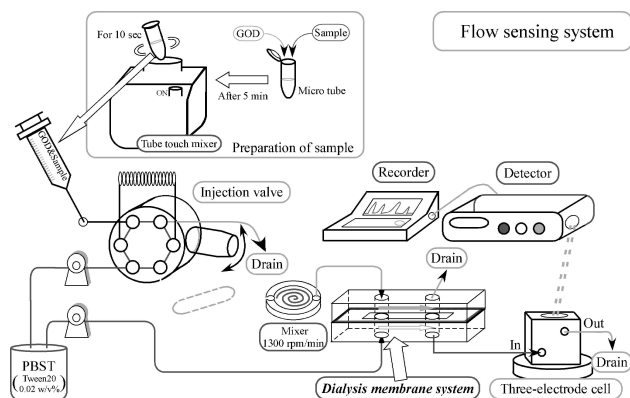


Fig. 1 Schematic diagram of flow sensing system.

Results and Discussion

Figure 2 shows the relationship between response current and the concentration of glucose. Blue line is the response of glucose sample prepared with water. Red line is the response of urine sample diluted 200 times (vol.) in water. Both showed good agreement in response. This indicates that the glucose measuring system can be applied to urine sample.

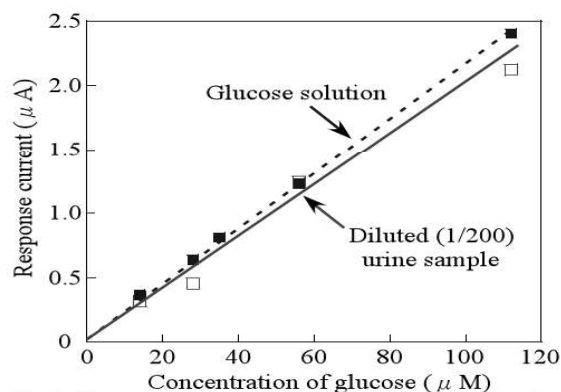


Fig. 2 Relationships between response current and concentration of glucose, in measurement of diluted (1/200) urine sample and prepared glucose solution.