

Label-free Immunoanalysis with GAO(galactose oxidase) Bioelectrocatalysis by Using Virtual Beaker Array

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We developed a convenient and simple method for the determination of glycoproteins using galactose oxidase on the basis of the contents of galactosyl and N-acetylgalactosaminyl residues in carbohydrate chains of glycoproteins, such as antibodies.^(1,2) Galactose oxidase converts galactose residues to their corresponding aldehydes and hydrogen peroxide, the latter being electroactive and quantifiable by DC amperometric i-t curve.⁽³⁾ We patterned the surface of the poly(dimethylsiloxane) (PDMS) substrate by microcontact printing (μ CP) with a dendrimer ink. Then, we immobilized the anti-DNP (dinitrophenyl) on the dendrimer-associated surface and constructed the virtual beaker array.⁽⁴⁾ As the concentration of antibody decreased in the solution, which caused less binding of antigens to the antibodies, a good correlation in amperometric signal with antibody concentration was registered. The total assay time was about 20 minute. For amperometric signaling, a bundle of three electrode, which was composed of miniaturized working, counter, and Ag/AgCl pseudo-reference electrodes, was employed. By using this technique, a multiplex immunosensing would be possible by using an array-type electrodes.

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References

1. B.B. Dzantiev, E.V. Yazynina, A.V. Zherdev. 2004. *Sensors and Actuators B.* 98. 254-261
2. Mitsuhiro Kinoshita, Kohei Inagake. 2000. *Analytical Biochemistry.* 284. 87-92.
3. Sergey shleev, Jan Tkac, Andreas Christenson, Tautgirdas Ruzgas, Alexander I. Yaropolov, James W. Whittaker, LO Gorton. 2005. *Biosensors and Bioelectronics.* 20. 2517-2554.
4. Hongwei Li, Dae-Joon Kang, Mark G. Blamire, Wilhelm T.S. Huck. 2002. *Nano Letters.* Vol 2. 347-349.