

碳纳米管组装电化学免疫传感器测定IgG抗体的研究

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摘要:

应用吸附法将IgG抗原固定于多壁碳纳米管修饰的玻碳电极表面, 制备用于IgG抗体检测的电化学免疫传感器。以辣根过氧化物酶为标记物, 对苯二酚为底物, 用辣根过氧化物酶标记 IgG 抗体与待测 IgG 抗体竞争电极表面固定的 IgG 抗原, 建立了免疫竞争法检测 IgG 抗体的高灵敏度电化学分析方法。碳纳米管的大面积和电化学催化作用, 提高了分子识别物质的固定量和电化学检测的灵敏度。工作电位为 +0.030V (vs. SCE) 时, 响应电流与 IgG 抗体浓度在 0.30 ~ 10 µg/ml 围内呈良好的线性关系, 检出限为 0.11 µg/mL。

关键词: 电化学免疫, 碳纳米管, IgG, 辣根过氧化物酶

Amperometric immunosensor for anti-IgG antibody based on a glassy carbon electrode modified with multiwall carbon nanotubes

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Abstract:

A highly sensitive amperometric immunosensor for anti-IgG antibody based on a glassy carbon electrode modified with multiwall carbon nanotubes (MWNT) was developed. A MWNT layer formed on a glassy carbon electrode was utilized as a sensing platform for the immobilization of IgG antigen and a competitive immunoreaction occurred with analyte anti-IgG antibody and horseradish peroxidase (HRP)-labeled anti-IgG antibody competed for the surface-immobilized IgG antigen binding sites. The catalytic reduction current at +0.030 V (vs. SCE), which is produced in the reaction of hydroquinone with hydrogen peroxide in the presence of HRP, is linear over a range from 0.3 to 10 µg/mL anti-IgG antibody with a detection limit of 0.11 µg/mL.

Keywords: Amperometric immunosensor; multiwall carbon nanotubes; anti-IgG antibody; horseradish peroxidase

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