基于蛋白A-纳米金-丝网印刷电极的雌二醇免疫传感器

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摘　要：

将蛋白A固定在纳米金修饰的丝网印刷电极表面，纳米金大的比表面积以及较高的表面自由能使蛋白A比较牢固地固定在其上；蛋白A分子可以定向结合17β-雌二醇抗体的Fc片段，使抗体在电极表面有序固定化。利用17β-雌二醇和酶标17β-雌二醇的酶免疫竞争反应，研制了快速测定17β-雌二醇的电化学传感器。用循环伏安法和扫描电子显微镜对修饰过程进行了表征。优化测定条件后，传感器呈现了很高的测定灵敏度，电流响应信号与17β-雌二醇浓度在0.1～20 μg/L范围内呈良好的负线性相关，检出限为0.035 μg/L（S/N =3）。应用该免疫传感器测定了正常人群尿样中17β-雌二醇含量，测定范围与报道的高效液相色谱法测定结果相一致，样品加标回收率为96%～114%。

关键词：免疫传感器；纳米金；蛋白A；17β-雌二醇；丝网印刷电极

A Immunosensor for Detection of 17β-Estradiol Based on Screen-printed Electrode with Nano-gold and Protein-A

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Abstract:

A immunosensor for detection of 17β-estradiol was prepared by modifying nano-gold and protein-A on the surface of screen-printed electrode. The large specific surface area and high surface free energy of gold nanopaticles could make protein-A molecules immobilized firmly , and then protein-A was used to directionally immobilize the Fc portions of anti-17β-estradiol antibody. Thus a immunosensor was developed for rapid detection of 17β-estradiol by competitive enzyme-linked immunoassay. The modified process was characterized by scanning electron microscopy (SEM) and cyclic votammetry (CV). Under the optimized conditions, the immunosensor showed high sensitivity. There was a negative linear correlation between the current of reduction peak and the concentration of 17β-estradiol in the range of 0.1-20 μg/L with a detection limit of 0.035 μg/L（S/N =3）. When this immunosensor was used to determine the real normal human urine samples, the results were consistent well with high performance liquid chromatography method, and the recovery was in the range of 96 %-114 %.

Keywords: Immunosensor; Nano-gold; Protein-A; 17β-estradiol; Screen-printed electrode

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