Combined Determination of Carbohydrate Antigen 199 and SirT1 Based on an Electrochemiluminescence Immunosensor

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In this work, a multi-functionalized graphene oxide (GO) material, where N-(4-aminobutyl)-N-ethylisoluminol (ABEI) and either a CA199 antibody or a SirT1 antibody were chemically bound to the surface of magnetic GO (nanoFe₃O₄@GO), was fabricated as a one-step electrochemiluminescence (ECL) immunosensor for the ultrasensitive determination of the carbohydrate antigen 199 (CA199) and human sirtuin1 (SirT1). The determination was carried out using a sandwich system, with the quantification of CA199 and SirT1 achieved through potential cycling from +0.6 to −1.4 V. This strategy was successfully used for the determination of the two tumour markers over the range of 0.3 fg/mL - 22 pg/mL, and the limit of detection (LOD) was calculated as 0.15 fg/mL.

Keywords: Combined determination; Carbohydrate antigen 199; Electrochemiluminescence method; Glioma diagnosis;

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