

Homogeneous peptide-based electrogenerated chemiluminescence method for determination of troponin I

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A novel homogeneous peptide-based electrogenerated chemiluminescence (ECL) method for determination of troponin I (TnI) was developed by using peptide (FYSHSFHENWPSK) as a molecular recognition element and ruthenium bis(2,2'-bipyridine) (2,2'-bipyridine-4,4'-dicarboxylic acid)-N-hydroxysuccinimide ester (Ru(bpy)₂(dcbpy)NHS) as an ECL label. Ru(bpy)₂(dcbpy)NHS was covalently labeled onto peptide through NH₂-containing lysine on the peptide via acylation reaction and was utilized as an ECL probe. In the presence of TnI, a decrease in ECL signal was observed upon the binding event between peptide and target TnI. The reason of the decrease in ECL intensity was studied by electrochemical method and attributed to the change of diffusion coefficient induced by binding event. The ECL intensity versus the concentration of TnI was linear in the range from 7.8×10^{-10} g/mL to 7.8×10^{-8} g/mL with a detection limit of 1.2×10^{-10} g/mL. The relative standard deviation for 2.6×10^{-9} g/mL was 3.8%. The proposed method has been applied to assay TnI in human control serum with satisfactory results. This work demonstrates that the combination of small peptide with a highly sensitive ECL technique for peptide-based homogeneous ECL bioassay is a great promising approach for sensitive and selective determination of protein.

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