Abstract

Introduction: Neuron-specific enolase (NSE) is the preferred biomarker for monitoring small cell lung cancer and neuroblastoma. In this project, a super-sensitive electrochemiluminescence (ECL) biosensor has been designed to measure NSE.

Methods: This biosensor consists of a nanosystem consisting of glucose-containing liposomes and magnetic nanoparticles, and a sensor based on a screen printed electrode modified with gold nanoparticles, multi-walled carbon nanotubes, glucose enzyme and polyluminol. The nanosystem part is for separating the NSE from the sample solution and the sensor part is the ECL signal measurement sensor.

Results: The results showed that this biosensor has high sensitivity, repeatability, selectivity and accuracy, satisfactory stability, low detection limit (1.28×10^{-5} ng.mL-1) and wide linear range (0.0001 to 100 ng.mL^{-1}).

Conclusion: The performance characteristics of real sample analysis show that this biosensor has significant performance and high potential for future clinical diagnosis and provides a promising potential for early detection of lung cancer.

Keywords: Biosensor, NSE biomarker, Electrochemiluminescence, Polyuminol, Liposome