Electrochemiluminescent Detection Within Complex Matrices

Lynn Dennany*[1]

[1]University of Strathclyde – Technology and Innovation Centre Dept. of Pure Applied Chemistry University of Strathclyde 99 George Street Glasgow G1 1RD Scotland, United Kingdom

Abstract

Electrochemical based detection methods are of growing importance in several areas of analytical chemistry especially in medical-diagnostics-related applications. However, a key issue is that the sensitivity of these assays is often not sufficient to allow disease biomarkers to be detected at a sufficiently low concentration so as to change clinical practice. This work examines low background electrochemiluminescence (ECL) for biomarker detection and the specificity of different platforms. This work investigates if detection limits can be achieved over clinically relevant ranges. We hope to demonstrate the robust reproducibility, selectivity and stability of electrochemical detection highlighting a novel platform for detection of biomarkers at low concentrations. A key challenge for this is direct detection of medically relevant biomarkers in whole blood without the need for pretreatment or extraction is a great challenge for biomedical analysis and diagnosis. ECL is a promising tool for this area of analysis. It can offer high sensitivities together with low background signals. These features allow for identification and quantification of medically relevant biomarkers in whole blood.1 Near infrared quantum dot based ECL sensors are utilised to achieve this, allowing for the rapid detection of these biomarkers and providing a platform for future development. Significantly, the near infrared quantum dots exhibited excellent penetrability through biological samples such as whole blood. This will likely be at the forefront of development in biosensing and imaging fields in the foreseeable future.

Keywords: ECL, biomedical diagnostics, biosensors

*Speaker