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AN ELECTROCHEMILUMINESCENT SENSING DEVICE FOR LIVING CELL OXYGEN METABOLISM MONITORING

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Cellular metabolism monitoring plays a critical role in cell therapy; clinical transplantation and effective drug screening since high quality control of cultivated cells are required. Cellular metabolism state can be reflected by the parameters including pH, oxygen, glucose, and carbon dioxide etc. In particular, cellular oxygen metabolism is more important, it not only directly relates to adenosine triphosphate production and energy consumption, but is also probably to trigger the cell oxidative stress (OS) in abnormal conditions. The OS is a condition of the imbalance between the systemic manifestation of reactive oxygen species (ROSs), e.g. O_2^- (superoxide radical), $OH^\bullet$ (hydroxyl radical) and H_2O_2 (hydrogen peroxide), etc., and the ability to detoxify them or to repair the resulting damage. The aim of this study is to develop a novel sensing platform for the investigation of cell oxygen metabolism. With chitosan@ TiO_2 nanocomposites decorated on the surface of indium tin oxide glass to act as sensor substrate which can effectively absorb A549 cells, and to sensitize the

electrochemiluminescence (ECL) of luminol, the cell-based sensor can be built up. On this sensing platform, the ECL output is dependent on the level of ROSs, which was evidenced by the injection of resveratrol, a typical antioxidant. The results indicated that the ECL sensing signal was quenched by the resveratrol within its concentration range from 0.1 nM to 2.97 μ M. Thus, it is believable that the ECL of luminol is sensitively responding to oxygenic matters on this cell biosensing platform, will be powerful for cell oxygen metabolism monitoring.

Biography

Tu Yifeng has completed his PhD in Analytical Chemistry at Nanjing University. He has worked as Professor of Analytical Chemistry at Soochow University, China. He has published more than 100 papers in reputed journals and has been serving as a Director of PhD in the field of "Electrochemical biosensing and electrochemiluminescent analysis".

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