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Rapid detection and quantification of free hemoglobin and haptoglobin by nanogold modified electrochemical impedance spectroscopy YU-NING LU, HSING-YUAN LI, HSUEH-LIANG CHU, TSIA-MU CHENG, SHIN-HUA TSENG, CHIA-CHING CHANG, Department of Biological Science and Technology, National Chiao-Tung University, Taiwan, R.O.C. — Free Hemoglobin (Hb) is a metabolic substance that damage tissue and vessel. It is released from destructed red blood cell and causes infection or inflammatory of human body. In blood plasma, haptoglobin (Hp) binds free Hb with high affinity and prevents the damage which is caused by cell free Hb. Hp has three phenotypes, that are Hp1-1, Hp 2-1, and Hp 2-2. Different phenotypes of Hp has been different affinities to Hb. It is known that electrochemical impedance spectroscopy (EIS) provide more information for detecting the small amount bio-molecules, include protein and DNA. In this study, we have developed a simple, fast, reliable and sensitive platform to quantify concentration of free Hb and Hp. In this platform, detection probe has been modified with nano gold and the surface charge transfer resistance of Hb and Hp binding could be detected and quantified within 18 min. This is a whole new platform to quantify free Hb in the serum of human to our knowledge.

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