A NEW IMPEDIMETRIC BIOSENSOR UTILIZING VEGF RECEPTOR-1 (FLT-1): EARLY DIAGNOSIS OF VASCULAR ENDOTHELIAL GROWTH FACTOR IN TUMOR GROWTH

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A new impedimetric biosensor, based on the use of vascular endothelial growth factor receptor-1 (VEGFR1), was developed for the determination of vascular endothelial growth factor (VEGF). VEGF-R1 was immobilized through covalent coupling with 3-mercaptopropionic acid which formed a self-assembled monolayer on gold electrodes. Cyclic voltammetry (CV) and electrochemical impedance spectroscopy techniques were employed to characterize the immobilization process and to detect VEGF. To successfully construct the biosensor current, experimental parameters were optimized. Kramers–Kronig Transform was performed on the experimental impedance data. The obtained results provided a linear response range from 10 to 70 pg/mL human VEGF. The applicability of the developed biosensor in the determination of VEGF in a spiked artificial human serum sample was experienced, yielding average recovery of 101%, in that order, with an average relative deviation value less than 5%.