

## A Novel and Sensitive Immunosensor System for Early Diagnosis of Rheumatoid Arthritis

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### **Abstract:**

Rheumatoid arthritis (RA), also known as inflammatory rheumatism, is a chronic inflammatory collagen tissue disease that usually occurs in the small joints of the hand, wrist, foot and ankle, the joint structures of the knee and elbow, and less commonly in the joint areas affecting the shoulder and hip. For the diagnosis of RA, anti-citrullinated protein antibodies (ACPA) have recently gained acceptance as biomarkers owing to their excellent specificity [1]. The goal of this research is to create an immunosensor that can detect anti-citrullinated vimentin (Anti-CV), an autoantibody involved in the pathogenesis of RA. For this purpose, the ITO-PET working electrode, which is preferred due to its practicality, cheapness and high sensitivity, was modified with 2-cyanoethyltriethoxysilane (2-CETES) agent. Electrochemical impedance spectroscopy and Cyclic voltammetry techniques were used to follow the immobilization steps and determine analytical characterization of the designed immunosensor system. The results obtained from analytical characterization studies such as repeatability, reproducibility and linear range determination prove that the designed biosensor has an ultra-wide detection range, is practical, stable and sensitive.