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Abstract

Microdevice immunoassay with conjugated magnetic nanoparticles for rapid anti-cyclic citrullinated peptide (anti-CCP) detection

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Abstract:
Anti-cyclic citrullinated peptide IgG antibodies (anti-CCP) are produced as an immune response in the presence of post-translational modified peptides known as cyclic citrullinated peptides (CCP). Anti-CCP have been considered as specific biomarkers for the diagnosis of rheumatoid arthritis (RA), and due to their high specificity, it is possible to make a differential diagnosis of other rheumatic diseases. These autoantibodies can be detected in the early stages of RA and even up to 10 years before presenting the first symptoms of the disease opening a window of opportunity for timely treatment. The most widely used method for anti-CCP detection is an enzyme-linked immunosorbent assay (ELISA). Despite its great sensitivity, ELISA is considered as a time-consuming assay. In this work, a simple straight channel microdevice and CCP conjugated magnetic nanoparticles (MNPs-CCP) as solid support for quantifying anti-CCP was developed and probed for plasma. For the spectrophotometric detection a microdevice with an optical flow Z cell design coupled with optical fibers was used. The microdevice immunoassay, employing only 6 μL of sample and reagents, was almost nine times faster than a commercial anti-CCP ELISA kit but equivalent results were obtained. Furthermore. The detection range was 0.70-2000 U mL-1 with a limit of detection of 0.70 U mL-1 (16 times more sensitive than the compared ELISA kit). The microdevice immunoassay, with conjugated

MNPs-CCP is a simple method for anti-CCP quantification being cheaper, faster and more sensitive than the ELISA kit.

Biography:
Kenia Chávez graduated with honors from the BSc. Chemistry in 2014 at UNAM. In 2017, she has completed her master's degree at the School of Chemistry (UNAM) and began her PhD studies. Her current research includes a multidisciplinary project with the intention of developing microdevices focused on clinical diagnosis through the detection and quantification of antibodies present in blood plasma by means of an Enzyme-Linked Immunosorbent Assay (ELISA).

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