ELECTROCATALYTICAL IMMUNOSENSING METHODS BASED ON GOLD NANOPARTICLES

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In this work, electrocatalytical methods are developed in order to improve the sensitivity of a model immunosensor based on a labelling method using gold nanoparticles (AuNPs). Microparamagnetic beads (MB) are used as primary antibody immobilisation platforms and AuNPs modified with a secondary antibody as high sensible electrochemical labels.

Different kinds of carbon electrodes are characterized so as to be used as a signal transducer. The electrodes used incorporate a magnet that allows the collection / immobilization on its surface of the immunological sandwich attached to the MB.

Briefly, the sandwich type assay consists in the incubation of streptavidin-coupled-MB with an anti-human IgG biotin conjugate, and then, the immunological reaction with the human IgG antigen takes place. After that, a gold labelled anti-human IgG reacts with the antigen. The final detection is based on the catalytic effect of AuNPs on the electroreduction of different species like silver ions or protons. The main parameters that affect the different steps of the developed assay are optimised so as to reach a high sensitive electrochemical detection of the model protein.

The low levels of AuNPs detected with these methods allow the obtaining of an immunosensor with a low antigen detection limit with special interest for further applications in protein and DNA analysis.

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