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Inclusion of divergent technologies in future point-of-care devices

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Point-of-care devices have emerged as a viable solution for the monitoring and diagnosis of different pathologies without medical intervention, and are meant to provide non-trained individuals with real-time diagnostic results. In general, point-of-care devices use a biosensor and an end-user device for the detection of a target analyte, e.g. proteins, cells, nucleic acids and metabolites, which can be related to a specific disease. Although there are many different techniques through which an analyte can be detected, immunoassays and electrochemical measurements have shown to be of special interest. In particular, electrochemical based point-of-care devices measure a change in the charge transport capacity between two electrodes via cyclic voltammetry, or a change of the electrical impedance via electrochemical impedance spectroscopy. Hereby, the design and fabrication of two different electro-immuno point-of-care devices for the detection of the human papilloma virus (HPV) and tuberculosis are presented. In both cases, a well array is placed on gold electrodes were specific antibodies are immobilized. Each well behaves as an individual biosensor through which electrochemical measurements are used to determine the presence of the target protein. The biosensors are integrated with an electronics reader that constitutes the end-user device, and are meant to be used by non-trained individuals.

Biography

Johann F. Osma has completed his PhD at the age of 28 years in Chemical Engineering from Rovira i Virgili University. He is an Associate Professor at Universidad de los Andes (Colombia) and head of the biomicrosystems research field from the microelectronics research center (CMUA) at the same university. He manages a clean-room specialized on biosensors and microfluidic systems dedicated to environmental monitoring, hazardous material detection, defense and aerospace. Also, he is the general secretary of the Colombian Nanoscience Network.

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