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Rapid, accurate and simple microfluidic device based on fluorescent read-out immunoassay for the determination of oral anticoagulants compounds in treated patients

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A high-throughput screening (HTS) immunochemical method for the measurement of plasmatic levels of oral anticoagulants (OAC) is presented. Oral anticoagulant therapy (OAT) such as acenocoumarol (ACL), warfarin (W) and phenprocoumon (PPC) is prescribed to prevent deep vein thrombosis, pulmonary embolism, myocardial infarction and stroke. About 2 % of the population is estimated to be under OAT which expenditures were about $ 144 million in 2011. The main problem associated to OAT is related to the narrow therapeutic window of these drugs and to the unpredictable dose-response relationship, thus, is one of the causes for visiting the emergency room at the hospitals. We present the production of specific antibodies for W, ACL and PPC, and their use to establish an ELISA. The immunochemical method developed is able to accurately quantify these OACs in plasma samples at concentration in the nanomolar range. The ELISA has been used to measure the plasmatic levels of patients under OAT efficiently, accurately in short period of time. Moreover, the high-quality of the antibodies produced allows envisaging the possibility to develop a point-of-care (PoC) device to assist on the patient compliance assessment programs. Therefore, a microfluidic system has been developed and merged with the bio reagents to achieve proof-of-principle for a disposable device that could help clinicians monitor patients under OAT. The read-out of the device is based on fluorescent labels that can be easily read with a scanner. The system was tested in order to have a robust and reproducible signal and subsequently an accurate result.

Biography

J Pablo Salvador completed his PhD in Chemistry from the University of Barcelona in 2007. Currently he's joined a permanent position contracted by CIBER-BBN. His PhD was focused in the production of antibodies and development of immunochemical techniques for the detection of anabolic steroids. After 2007, he became a Research Associate carrying out investigations in biosensor area based in fluorescence and plasmonic transduction for different applications, clinical, food safety and environmental control. He has been co-author of about 20 publications and is responsible for some national and European funded projects.

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