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Point-of-care electrochemical cortisol sensing for health care monitoring

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Cortisol is a potentials psychological stress biomarkers and its abnormalities due to everyday competitive life style causes many diseases. The secretion of cortisol levels found to be affected by diseases progression and substance of abuse. Thus cortisol detection and monitoring is crucial for optimization of diagnostics to decide therapeutics. In this word, for the first time, we have developed a simple, low-cost, label-free, electrochemical immunosensing platform for sensitive and selective detection of cortisol (at pM). Anti-Cortisol antibodies (Anti-C_{ab}) immobilized self-assembled monolayer (SAM) modified microfabricated interdigitated electrodes based electrochemical cortisol in integrated with miniaturized potentiostat and a microfluidic manifold for point-of-care application. This M-P is capable to detect cortisol and exhibited a detection range from 10 pg/mL to 100 ng/mL, a detection limit of 10 pg/mL, and a sensitivity of 6 μA/(pg/mL) with the regression coefficient of 0.99. This developed electrochemical immunosensor also successfully detect saliva cortisol farm workers and plasma cortisol of HIV positive patients. Results obtained in both cases are validated with ELISA (2-5% variation). The purposed protocol can be used to correlate psychological stress of farm workers on exposure of pesticides and HIV patients with virus-infection progression parameters to optimize diagnostic and therapeutic decision.

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Hybrid devices with integrated CMOS and smart consumables for biomedicine: Aspects of technologies and commercialization

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Smart consumables based on polymer materials with nano-/microscale or supreme optical features are prerequisites for emerging applications in the biomedical markets as in in-vitro diagnostics. Single molecule detection techniques based on fluorescence read-out methods are a prominent example for a number of commercial products. The need for highly parallel read-out of e.g. electrical signals requires the use of CMOS components. Such concepts are required for example in DNA sequencing technologies. Hence, the functional integration of CMOS components in microfluidic, polymer chip architectures is becoming of key importance in a successful product development. The increasing complexity of such new products requires new manufacturing technologies. Sony DADC BioSciences provides in its partnering business a deep know-how in development, manufacturing and supply of polymer-based smart consumables to OEM partners. Specializing in customized mass manufacturing of highly sophisticated consumables, Sony DADC actively applies expertise in innovation to offer state-of-the-art solutions to the biomedical industry.

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