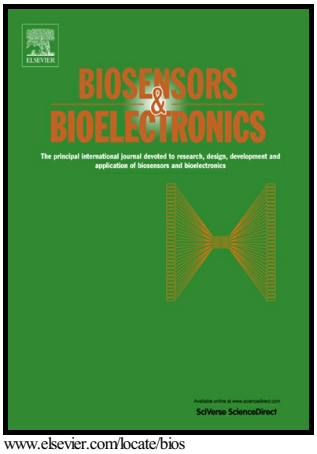

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Detection of plasma MMP-9 within minutes. Unveiling some of the clues to develop fast and simple electrochemical magneto-immunosensors.

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ABSTRACT

Magnetic beads (MB) have been extensively used to produce sensitive and efficient electrochemical magneto-immunosensors. However, MB effective handling requires training, and MB washing after each incubation step is time consuming and contributes to raise result variability. Consequently, most of the electrochemical magneto-immunosensors reported to date, which entailed relatively long and complex multi-step procedures, would be difficult to carry out at point-of-care (POC) settings or by laypersons. For this reason, here we targeted the development of a simplified detection path, which is fast and simple enough to be operated at a POC setting, sufficiently efficient to provide analyte quantitation comparable to classical diagnostic methods, and dependant on minimal technical requirements to facilitate method global exploitation. As a proof-of-concept, we optimized an extremely simple, fast and efficient electrochemical magneto-immunosensor for detection of matrix metalloproteinase 9 (MMP-9). To accomplish this, we optimized MB immunomodification, produced an immunomodified Poly-HRP signal amplifier, developed a