**Abstract**

The human hepcidin-25 hormone has a key role in iron regulation in blood. The clinical relevance of this hepatic ~ 2.8 KDa cysteine-rich peptide is rapidly increasing, since altered levels can be associated with inflammatory events and iron dysfunctions, such as hereditary hemochromatosis and iron overload. Moreover, hepcidin has also attracted the anti-doping field for its possible role as indirect marker of erythropoietin blood doping. Methods currently reported are based on immunoassays (ELISA, RIA), or various types of mass spectroscopy (MS)-based protocols, semi-quantitative or quantitative. Despite the great effort in optimizing robust and simple assays measuring hepcidin in real matrices, at present this challenge remains still an open issue. To explore the possibility to face hepcidin detection through the development of affinity-based biosensors, we set up a comparative study by Surface Plasmon Resonance (SPR) technology. An immuno-based, on anti hepcidin-25 IgG, and a biomimetic-based, on a synthetic peptide corresponding to the hepcidin-binding site on ferroportin (HBD), biosensors were developed. Here we report behaviors