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"A biomimetic sensor for monitoring oxidative stress biomarker in point-of-care"

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Free radicals and other reactive species are constantly generated *in vivo* and can cause oxidative damage to biomolecules, a process that seems to play an important role at the origin of cancer. 8-Hydroxy-2'-deoxyguanosine (8-OHdG) is a major product of DNA hydroxylation and is considered a biomarker of damage caused by oxidative stress (OS). Thus, early diagnosis of OS biomarkers may be used as a fundamental tool in cancer prevention and in more efficient therapeutic strategies. For this purpose, a biomimetic sensor for 8-OHdG detection and quantification by Electrochemical Impedance Spectroscopy (EIS) is proposed herein.

The biomimetic sensor was obtained by modifying a clean gold (Au) electrode with a OH-terminal thiol compound, followed by direct electropolymerization of phenol in the presence of 8-OHdG. The biomimetic/Au acted as working electrode, while glassy carbon and Ag/AgCl were used as counter and reference electrodes, respectively. Electropolymerization of phenol was performed by Cyclic Voltammetry (CV) over the potential range 0.2 to 0.9 V in pH 7.0 PBS buffer, enabling the formation of a non-conductive layer. Non-imprinted materials (NIM) were also performed by removing the template from the procedure and, then, the ability of the polymer to interact non-specifically with the template was measured.

Preliminary results showed the development of a direct and label-free biomimetic sensor with good performance, stability and sensibility. In particular, only MIP material was able to rebind to the target molecule and produce a linear response against EIS on the range 0.010 to 10ng/ml. Overall, the biosensor described herein is simple, precise and may allow routine use for biological samples *on-site*.