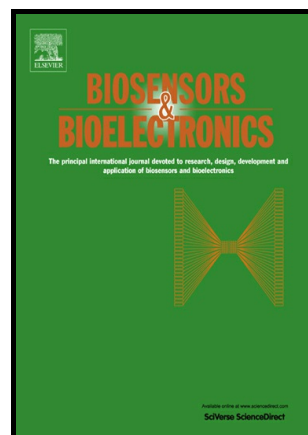


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# Aligned copper nanowires as a cut-and-paste exclusive electrochemical transducer for free-enzyme highly selective quantification of intracellular hydrogen peroxide in cisplatin-treated cells

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## Abstract

The role and reliable quantification of intracellular hydrogen peroxide during cancer therapy constitutes an unexplored and fascinating application. In this work, we report the fabrication of vertically aligned copper nanowires ( $v$ -CuNWs) using electrosynthesis on templates, and their application as a cut-and-paste exclusive and flexible electrochemical transducer. This easily adaptable electrodic platform is demonstrated for a fast, simple and free-enzyme selective quantification of intracellular hydrogen peroxide in Cisplatin-treated human renal HK-2 cells. The  $v$ -CuNWs sensor was compared with an HRP-enzyme-based biosensor showing excellent correlation and indicates the good selectivity and analytical performance of the  $v$ -CuNWs.

This sensing approach opens novel avenues for monitoring cell death processes and shows the potential of H<sub>2</sub>O<sub>2</sub> as a cellular damage biomarker, with a clear potency for further developments for *in vitro* diagnosis and its implication in cancer therapy.

## Keywords

Nanowires on cello-tape strip, intracellular and extracellular hydrogen peroxide, HK-2 cells, cisplatin, death cell, cancer.

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<sup>1</sup> **Author Contributions.** L. G. C. and M. M. G contributed equally.

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