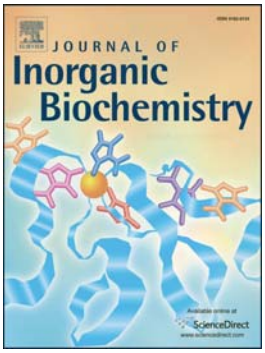

Experimental and theoretical studies of copper complexes with isomeric dipeptides as novel candidates against breast cancer

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EXPERIMENTAL AND THEORETICAL STUDIES OF COPPER COMPLEXES WITH ISOMERIC DIPEPTIDES AS NOVEL CANDIDATES AGAINST BREAST CANCER

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Abstract

In the search for new cytotoxic drugs, two copper complexes with isomeric dipeptides (Ala-Phe and Phe-Ala) were developed in order to determine the influence of their different structures in the modulation of the chemical, biochemical and biological properties.Spectroscopic, voltammetric and equilibrium studies were performed providing information about the chemical properties. The superoxide dismutase (SOD) activitywas studied and showed differences of IC_{50} for both Cu-Ala-Phe (IC_{50}=4.5) and Cu-Phe-Ala (IC_{50}=45). The computational results permitted to explain this behavior proposing that it is feasible that the O_2^- anion is attracted straight to the positive zone in Cu-Ala-Phe whereas for Cu-Phe-Ala this phenomenon would happen to a smaller extent. Confirming our previous studies, both complexes interacted with DNA. Molecular docking studies showed that the position of the phenyl ring modulates the complex-DNA affinity and in Cu-Ala-Phe the docked conformation allows the copper ion to face the DNA basis, giving rise to a more stable complex-DNA adduct than for Cu-Phe-Ala. In spite of the fact that Atomic Force Microscopy showed plasmid compactation and aggregation for both complexes, the image showed softer changes in the case of Cu-Ala-Phe in comparison with those produced by Cu-Phe-Ala. In order to