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Données Récentes et Applications Cliniques

ABSTRACTS

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SUPEROXIDE DISMUTASE ACTIVITY OF DOUBLY BRIDGED DINUCLEAR COPPER(II) ACETATE COMPLEXES WITH N-METHYLIMIDAZOLE, AZIDE AND CHLORIDE

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Cu,Zn-Superoxide dismutase is one of the metalloenzymes that catalyzes the dismutation of the superoxide anion. It protects the living cells from several diseases which are caused by this toxic anion, including inflammation, aging, and cancer. The direct utilization of this natural enzyme as a pharmaceutical agent poses many problems. So considerable efforts have been made in order to obtain stable, nontoxic, and inexpensive low molecular weight biomimetic molecules which are able to catalyze the dismutation of superoxide anion and therefore to provide therapeutic applications. We report here the characterization and SOD mimetic activity of four dinuclear copper(II) acetate complexes with N-methylimidazole, azide and chloride. Spectral and magnetic data for N-methylimidazole adduct, $[\text{Cu}_2(\text{OAc})_4(\text{N-MeIm})_4] \cdot 6\text{H}_2\text{O}$ (1) are consistent with its dinuclear structure containing two distorted square-pyramidal $\text{CuN}_2\text{O}_2 + \text{O}$ chromophores. The copper atoms are connected by two acetates act as monodentate bridging ligands. The data for the mono-azide adduct, $[\text{Cu}_2(\text{OAc})_3(\text{N}_3)(\text{N-MeIm})_4] \cdot 4\text{H}_2\text{O}$ (2), the bis-azide adduct, $[\text{Cu}_2(\text{OAc})_2(\text{N}_3)_2(\text{N-MeIm})_4] \cdot 4\text{H}_2\text{O}$ (3), and the chloride adduct, $[\text{Cu}_2(\text{OAc})_3(\text{Cl})(\text{N-MeIm})_4] \cdot 4\text{H}_2\text{O}$ (4), are consistent with dinuclear structure and similar to that for complex (1), except the azide or chloride ions replaced one of the two terminal acetate ligands, (2) and (4), or the two terminal acetate ligands, (3). The reactivity of these complexes toward superoxide has been investigated using the indirect xanthine-xanthine oxidase-nitroblue tetrazolium method and compared to that of the native Cu, Zn-SOD enzyme. The $\text{IC}_{50}/\mu\text{M}$ values are : 0.18 (1) , 0.12 (2), 0.43 (3) , 0.11(4) , and 0.04 for the enzyme.

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