

Mechanistic insights into selective DNA strand scission mediated by bis-[2-(2-pyridyl)ethyl]amine Copper(II) complexes

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A homologous series of dinuclear copper (II) complexes containing the binucleating ligand NnPY2 {NnPY2 are $-(CH_2)_n-$ ($n = 3-5$) linked bis-[2-(2-pyridyl)ethyl]amine units} were studied for their ability to cleave duplex DNA in the presence of 3-mercaptopropionic acid (MPA) and dioxygen. The N4PY2 and N5PY2 complexes supported selective strand scission at the single strand/double strand junction while the N3PY2 complex was found to be inert. Equivalent results were observed when low concentrations of H₂O₂ were used in place of MPA and dioxygen. Mechanistic insights into the reaction suggest that the strand scission likely results from the formation of a copper-dioxygen species in accordance with Cu(I)/O₂ reactivity studies. Studies into the specificity of the reaction as well as the recognition sites will also be discussed.