

## Spectroscopic and voltammetric studies of certain copper complexes bound to calf thymus DNA

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To evaluate the binding equilibrium in the nuclease reactions of  $\text{Cu}(\text{Phen})_2^+$  the interaction of few copper complexes having positive redox potentials relative to the artificial nuclease  $\text{Cu}(\text{Phen})_2^+$  with calf thymus DNA have been investigated using spectroscopic and voltammetric studies. Electronic and EPR spectral and electrochemical studies have been carried out for the interaction of  $\text{Cu}(\text{dpsmp})_2^{2-/3-}$  [ $\text{dpsmp} = 2,9\text{-dimethyl-4,7-bis-}((\text{sulfonyloxy})\text{phenyl})\text{-1,10-phenanthroline}$ ],  $[\text{Cu}(\text{pdto})(\text{ClO}_4)](\text{ClO}_4)$  [ $\text{pdto} = \text{bis}(2\text{-pyridyl})\text{-3,6-dithiaoctane}$ ], and  $[\text{Cu}(\text{pdo})](\text{ClO}_4)_2$  [ $\text{pdo} = \text{bis}(2\text{-pyridyl})\text{3,6-diazaoctane}$ ] with DNA.  $[\text{Cu}(\text{pdto})(\text{ClO}_4)](\text{ClO}_4)$  appears to intercalate with DNA as suggested by the absorption hypochromism. Enhancement in emission and hyperchromism in the absorption spectra, observed for  $\text{Cu}(\text{dpsmp})_2^{3-}$  on adding DNA may be due to the mixed mode of intercalation and surface binding. The electrochemical behaviour of  $[\text{Cu}(\text{dmp})_2]\text{BF}_4$  [ $\text{dmp} = 2,9\text{-dimethyl-1,10-phenanthroline}$ ] and  $[\text{Cu}(\text{bcp})_2]\text{BF}_4$  [ $\text{bcp} = 2,9\text{-dimethyl-4,7-diphenyl-1,10-phenanthroline}$ ] bound to DNA have been compared with the analogous sulphonated complex. The Cu(II) rather than Cu(I) species interacts more strongly with DNA. Geometry of the copper complexes is the main criteria in distinguishing the hydrophobic interactions from the electrostatic one. The binding parameters obtained for multiple oxidation states and substituent effects on DNA binding are discussed.

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