PREFACE

This thesis deals with some novel copper(II) complexes as synthetic nucleases. The synthetic, structural, electrochemical and magnetic aspects of these complexes have been investigated in detail.

Chapter I gives a brief introduction about various metal complexes and their interaction with DNA. It gives an outline of the types of DNA cleavage, and the transition metal complexes in different types of nuclease activity, viz. chemical nuclease activity, photo induced DNA cleavage and hydrolytic cleavage.

In the following three chapters, the synthesis and DNA cleavage of a series of copper(II) complexes are described where metal to heterocyclic base (ligand) ratio is 1:1. Chapter II describes binding and cleavage of DNA by mononuclear copper(II) complexes having phenanthroline bases. Chapter III deals with the chemical nuclease activity of oxalato bridged dicopper(II) complexes of planar aromatic heterocyclic bases as terminal ligands. Chapter IV deals with the aspects of chemical, photochemical and hydrolytic cleavage of DNA by dihydroxo bridged dicopper complexes having heterocyclic bases. The mechanistic aspects of the DNA cleavage reactions are explored.

Chapter V describes the photoinduced DNA cleavage activity of new ternary copper(II) complexes of phenanthroline bases and thiosemicarbazones. Chapter VI reports the synthesis, crystal structure and the photo-induced DNA cleavage property of new ternary copper(II) complexes having aromatic heterocyclic bases and L-methionine salicylaldehyde Schiff base. Mechanistic aspects of the cleavage reactions are described in detail.

Complexes presented in the thesis are represented in bold letters. The references are compiled at the end of each chapter, and are indicated in the text in superscripts. Due acknowledgements are made wherever needed. Any omission that might have occurred due to oversight or error is regretted.

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