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Enantiomeric Copper Complexes Promote Therapeutically Relevant Cleavage of G-Quadruplex Telomeric DNA

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Copper-based enantiomeric complexes (1S and 1R) were readily synthesized from 2-hydroxy-1-naphthaldehyde and R/S-2-amino-2-phenylethanol and were thoroughly characterized by structural {spectroscopic and single X-ray crystal diffraction studies}, electronic, vibrational, magnetic and reactivity studies. The single X-ray crystallography of ligand LS, 1S and 1R was performed which revealed their chiral structures with space groups P21, P-1 and P1, respectively. The enantio selectivity for ligands LS/Rand complexes 1S/R was evaluated from their in vitro DNA binding profiles, while cleavage studies of complexes (1S and 1R) with G-quadruplextelomeric DNA and pUC19 plasmid DNA exhibited significant reactivity. Cellular studies of 1S and 1R were carried out on a panel of human cancer cell lines; Huh7, MCF7, BxPC3 and AsPC1, which displayed significant cytotoxicity and differential responses toward different cancer phenotypes.