



International Symposium on Metal Complexes

XXI Italian-Spanish Congress on
Thermodynamics of Metal Complexes

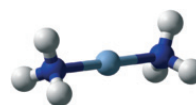


ISMEC2010

Bilbao (Spain)

7th-11th June 2010

BOOK
OF
ABSTRACTS

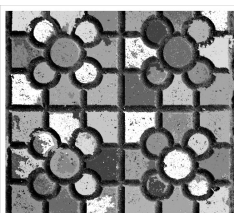


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THE INTERACTION OF NATIVE CALF THYMUS DNA WITH DIPYRIDO[3,2-A:2',3'-C]PHENAZINE AND ITS HETEROLEPTIC IRON(III) COMPLEXES.

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In the last decades, the interaction of DNA with heteroleptic octahedral transition metal complexes of the dppz ligand (dppz=dipyrido[3,2-a:2',3'-c]phenazine) has attracted a wide interest for the potential applications of such compounds as diagnostic probes, anticancer or therapeutics agents and in genomic research.

In fact, it has been shown that all the metal-dppz complexes investigated, independently of the nature of the ancillary ligands, are strong DNA intercalators, with binding constants, K_b , within the range 10^4 - 10^7 M⁻¹ [Terenzi et al., 2009] and that the dppz ligand intercalates between the stacked DNA bases because of its extended aromatic planar surface, preferentially from the major groove side. It has been generally realized that metal complexes of planar heterocyclic ligands are more effective DNA intercalators than the isolated ligand. Often, such property has been attributed to the water insolubility of the neutral organic ligand, which is obviously increased by the presence of a positively charged metal ion. For example, it has been reported that a water-soluble cationic derivative of dppz is a DNA-intercalator with a K_b value of 3.78×10^5 [Phillips et al., 2004]. As a further example, it has been recently reported on the interaction between DNA and [Fe^{III}(dppz)]Cl₃ in water solution [Terenzi et al., 2009]. Indeed, the complex presents several favorable properties: it strongly interacts with DNA, mainly by intercalation; iron is a biological ion and does not give rise to toxicity problems; the biological iron transport system could be used for its targeting; finally, its redox potential should fall in the biologically useful range thus enabling a potential activation by reduction mechanism. However, the latter metal complex gives rise to insoluble hydrolysis products at pH greater than 7.5, at difference from the Fe^{II}(phen)₂(dppz) complex [Mudasir et al., 2007], in which the concomitant binding of dppz and of the two phenantroline ligands fills the coordination sites of the metal and stabilizes the dicationic complex in water solution. In this context, we will present preliminary data on the synthesis and DNA interaction of Fe(dppz) complexes with aminoacids as ancillary ligands, chosen with the aim of possibly increasing the biocompatibility of the metal complex within the intracellular environment. Moreover, we will report on the DNA interaction of the sparingly water soluble dppz ligand.

References

- Mudasir, Wijaya K, Wahyuni ET, Inoue H, Yoshioka N, *Spectrochimica Acta A*, 2007; **66**:163.
 Phillips T, Haq I, Meijer AJHM, Adams H, Soutar I, Swanson L, Sykes MJ, Thomas JA, *Biochemistry*, 2004; **43**:13657.
 Terenzi A, Barone G, Silvestri A, Giuliani AM, Ruggirello A, Turco Liveri V. *Journal of Inorganic Biochemistry* 2009; **103**:1.