

## Interactions of cisplatin with nucleobases and nucleotides: an IRMPD study

J.-Y. Salpin(1) • B. Chiavarino(2) • D.Scuderi(3) • P. Maître

(1)LAMBE - UMR8587 CNRS-Université d'Evry Val d'Essonne, France • (2)Maria-Elisa Crestoni-Simonetta Fornarini Dipartimento de Studi di Chimica e Tecnologia delle Sostanze Biologicamente Attive, Università di Roma "La Sapienza", Roma, Italy • (3)Laboratoire de Chimie-Physique - UMR 8000 - CNRS - Université Paris XI, Orsay, France

Cisplatin (cis-diamminedichloroplatinum(II)) is a widely used anticancer drug that has been particularly successful in treating small cell lung, ovarian, or neck tumors.[1,2] Although cisplatin is one of the most successful anticancer drugs, side effects, natural and acquired resistance of patients toward the drug have motivated searches for structurally and/or functionally analogous alternatives.[2] Unfortunately, finding analogous compounds that outperform cisplatin has proved to be difficult. In this context, a better understanding at the molecular level of the interactions between the Pt and the nucleobase moieties is thought to be helpful in establishing a rational strategy to design cisplatin analogues. Experimentally, the coupling of mass spectrometry to InfraRed Multiple Photon dissociation (IRMPD) spectroscopy has proven to be a powerful method for probing the structure of gaseous metal cationized complexes.[3] We presently use this approach to characterize the structure of the cisplatin/guanine and cisplatin/dGMP complexes generated in the gas phase by electrospray ionization.

IRMPD spectra in the mid-infrared region (900 cm<sup>-1</sup>-1900 cm<sup>-1</sup>) were recorded by means of a Bruker Esquire 3000+ ion trap mass spectrometer coupled with the tunable IR beam provided by the CLIO free electron laser (Centre Laser Infrarouge Orsay). Theoretical calculations were carried at the B3LYP/6-31G(d,p) level, the LANL2DZ effective core potential and basis set being used to describe the platinum atom.[4,5] Harmonic vibrational frequencies were estimated at this level in order to classify the optimized structures as local minima or saddle points, and to compare computed and experimental infrared spectra.

### Bibliography

- [1] Rosenberg, B.; Van Camp, L.; Krigas, T. *Nature* 1965, 205, 698.
- [2] Jung, Y. W.; Lippard, S. J. *Chem. Rev.* 2007, 107, 1387.
- [3] Fridgen, T. D. *Mass Spectrom. Rev.* 2009, 28, 586.
- [4] Wadt, W. R.; Hay, P. J. *J. Chem. Phys.* 1985, 82, 284.
- [5] Hay, P. J.; Wadt, W. R. *J. Chem. Phys.* 1985, 82, 299.