Spectroscopic study of non-canonical DNA structures using advanced chemometrics methods

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The G-quadruplex having non-canonical structure has been found in telomers, with the life cycle in the cell, and in some oncogens and aptamers. These parts have been assumed as potential targets for anticancer therapies and therefore nowadays it can be observed the increase of interest in the drug development that can lead to its stabilization [1]. This work was focused on solution equilibria study of oligonucleotide BCL2 that is a 24-mer sequence which corresponds to the guanine-cytosine rich region of P1 promoter contained in BCL-2 human oncogene.

The molecular absorption spectroscopy in UV region was employed for oligonucleotide study in order to estimate the protonation constants and "melting points" at different pH and K^+ concentrations. Those informations threw light how the G-quadruplex is stabilized. The interaction of intercalators based on porhyrine skeleton with the G-quadruplex and its 2-aminopurine modified molecules was studied by means of molecular absorption, fluorescence and CD spectroscopies. The experimental combined data were evaluated by MCR-ALS approach. It was found that positively charged porphyrine derivative stabilizes significantly G-quadruplex. The probable interaction mechanism was proposed.

Acknowledgement:

The research was supported by Spanish Ministry of Education and Science (CTQ2006-15052-C02-01 and BFU2004-02048/BMC), ERASMUS/MUNDUS EU program and Ministry of Education of the Czech Republic (projects BIO-ANAL-MED (LC06035)),

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