

BENZO[C]PHENANTHRIDINE ALKALOIDS AND THEIR INTERACTION TO NON-CANONICAL DNA STRUCTURES

Petra JAROŠOVÁ¹, Raimundo GARGALLO², Petr TÁBORSKÝ¹, Ondřej PEŠ³

¹*Department of Chemistry, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic*

²*Department of Chemical Engineering and Analytical Chemistry, University of Barcelona, Martí I Franquès 1-11, 08028 Barcelona, Spain*

³*Department of Biochemistry, Faculty of Medicine, Masaryk University, Kamenice 5, 62500 Brno, Czech Republic*

Email of presenting author: 408846@mail.muni.cz

Non-canonical DNA secondary structures have become possible therapeutic targets in recent years. The most known types of these structures are the G-quadruplex (GQ) which is present in several protooncogenic-DNA promoters and thus participates in biological processes such as replication, transcription and translation and i-motif, which is sequence observed in cytosin-rich parts of the strand and is stable in lower pH conditions. The interaction of natural benzo[c]phenanthridine alkaloids (macarpine and sanguinarine) with parallel and antiparallel G-quadruplex DNA structures was studied, for comparison the competitive dialysis experiment with alkaloid berberine in lower pH was performed. Spectroscopically-monitored melting experiments, fluorescence titrations and competitive dialysis were used to observe the interaction of the oligonucleotides and alkaloids. The results showed that these alkaloids stabilized G-quadruplex structures in terms of increments of T_m values with high selectivity over duplexes and unfolded DNA. The presence of non-specific electrostatic interactions was also observed. Overall, the results pointed to a strong stabilization of G-quadruplex structures by these alkaloids.

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