

## *Influence of structural features of porphyrins on their ability to effect on DNA*

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**Abstract** - In order to clarify the effect of influence of porphyrin molecules configuration and chemical structure of their side radicals on hydrodynamic and spectral behaviors of DNA water soluble cationic *meso*-tetra-(3N-, 4N-hydroxyethylpyridyl, 3N-, 4N-allylpyridyl) porphyrins (H<sub>2</sub>THOEPyP4, H<sub>2</sub>THOEPyP3, H<sub>2</sub>TALPyP4, H<sub>2</sub>TALPyP3) and their metallocomplexes using viscometry and UV/Vis spectroscopy were investigated. The planar porphyrins H<sub>2</sub>THOEPyP4, H<sub>2</sub>THOEPyP3, H<sub>2</sub>TALPyP4, H<sub>2</sub>TALPyP3 and their metallocomplexes with Ni- and Cu- leads to an increase of DNA solutions viscosity at relatively small concentrations, and then a decrease of stable values. Such behavior corresponds to intercalation of these porphyrins in DNA structure, which results a decrease of helical twist and lengthening of the DNA molecules. When all intercalation sites are occupied, external binding occurs also, which leads to reduction of sizes and viscosity of DNA. In case of porphyrins with axial ligands (Zn, Co metallocomplexes) external binding mode occurs only. Change in position of peripheral radicals on pyridylic ring has absolutely no effect on interaction of outside binding porphyrins with DNA. In presence of planar porphyrins the structural changes of DNA are similar to previous one, but there are noticeable behavioral differences. Comparison of different locations of peripheral radicals on pyridylic rings leads to the conclusion that porphyrins with side radicals at 3N-position and its metallocomplexes are favorably located relative to the DNA helix axis than at 4N-position. It was shown that among the studied porphyrins, H<sub>2</sub>THOEPyP3 and its metallocomplexes interact with DNA most intensively. The viscometry and spectrophotometric measurements are in good agreement. The data obtained allows us to conclude that viscometry method provides the most definitive means of inferring the binding mode of porphyrins to DNA in solution even in the absence of other structural data.

**Keywords**—DNA, external binding, intercalation, porphyrin.

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