Study of Binding Modes of Synthetic Coumarin Derivates with DNA and Albumin

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Over the last years there is an intensive scientific interest to explore the binding modes of a small organic molucules which can interact with the DNA. It came out, that these molecules could change or stop the process of transcription or replication of the DNA and cause the cellular death, what is very important for developing anti-cancer and anti-HIV drugs. Coumarines should be able to interact by many modes with the DNA because of their planar molecules of aromatic systems. The aim of this work was studied the basic physicochemical properties of synthetic coumarines and their ability to bind with DNA and interact with albumin. To reach this aim there were used spectrofotometric and fluorescent methods. The ability to cut the DNA was confirmed using agarose electrophoresis. In pursuance of measurments it was shown, that the studied coumarines were able to interact with the DNA by intercalation. There was shown rather high fluorescence of studied compounds. Fluorescence spectroscopy also showed significantly good ability of studied coumarines to interact with albumin. Using agarose electrophoresis it came out, that the studied coumarines are able to cut DNA, with higher concentration of compound there was less of superhelical and more linear and open circle form of the DNA. The binding constant for complexes coumarin-DNA were determined from Uv-vis titration: Sample 1: 8,9; Sample 2: 4.0; Sample 3: 5,3×105 mol-1dm-3. These results can be used for further develop of anti-cancer and anti-HIV drugs.