Abstract

Cancer is a pathology responsible for a great number of deaths. The conventional methods of treatment, chemotherapy and radiotherapy, are not always efficient, and multiple side effects are intrinsic for these therapies. In early 70's appeared a new method called "Photodynamic Therapy" (PDT), that shows few side effects as compared with conventional therapies. The main idea of PDT is to introduce a fotoactive compound into the organism and then irradiate with visible light the site to be treated, producing the active form of the compound that induces the death of cancers cells. The compounds used for this purpose have some disadvantages in their application, which stimulates the search for best compounds.

In this work were studied several cyanine dyes with two interacting chromophores (BCD), which seem advantageous for use in PDT. The aim is to study spectral and energetic features of BCD in the presence of DNA, and at various ionic strengths, to suggest their use in cancer photochemotherapy. Four BCD studied in this work were characterized by different angles between chromophores.

The experimental analysis was made using various spectroscopic methods such as optical absorption, fluorescence and circular dichroism, and the theoretical treatment was based on computational programs both conventional and created in this work. The results show that BCD has high affinity with DNA molecules, forming various species thus changing the BCD excited state features. The presence of ions modifies the characteristics of dyes and their interaction with DNA. Analyzing the results we can conclude that the characteristics of BCD are promising for their application in PDT, and this makes reasonable future studies of the interaction of these dyes with natural systems such as cells culture and tumors in laboratory animals.