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Study on the Interaction between Distamycin Analogs and DNA from Herring Sperm by Fluorimetry

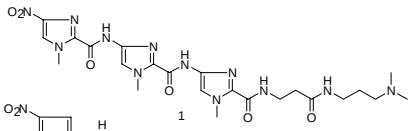
Han LIANG[1], Jing Jian LI[1]*, Xiao Dong LI[2], Fei Li TANG[2], Gu YUAN[2]*

[1]Department of Chemistry, Peking University, Beijing 100871
[2]The Key Laboratory of Bioorganic Chemistry and Molecular Engineering,
Department of Chemical Biology, Peking University, Beijing 100871

Abstract: The fluorescence spectra of the interaction between four new distamycin analogs and DNA from herring sperm have been studied in detail. The fluorescence quenching of the DNA by the analogs was observed, and the fluorescence intensity of the DNA was attenuated exponentially with the increasing of the analogs concentration.

Keywords: Distamycin analogs, fluorescence quenching, DNA from herring sperm.

Distamycin is a naturally occurring antibiotic which binds to the AT rich regions in minor groove of DNA[1]. We have reported the interaction between the analogs and calf thymus DNA by circular dichroism spectropolarimetry (CD) and isothermal titration calorimetry (ITC)[2]. Due to the greater sensitivity of fluorescence-based techniques in comparison with CD, we employ the fluorimety to explore the interaction between four new distamycin analogs and DNA from herring sperm.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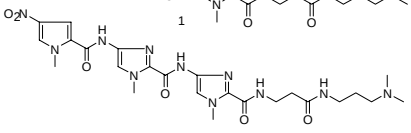
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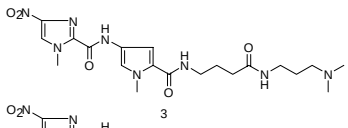
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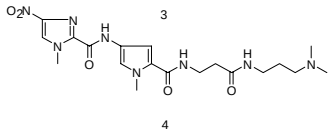
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Fluorescence measurements were obtained on a Perkin-Elmer LS50B fluorescence spectrophotometer by using excitation light set at 300 nm. Fluorescence spectra of the herring sperm DNA (0.125 mg/mL) and analog **1** (0.05 mg/mL) as well as mixture of both in 10 mmol.L^{-1} Tris-HCl solution are given in **Figure 1** (**a**), (**b**) and (**c**) respectively. It can be seen from **Figure 1** that the intensity of herring sperm DNA was strongly decreased and peak position shifts to longer wavelength (from 380 nm to 420 nm) in

*E-mail: jjli@chem.pku.edu.cn

the presence of distamycin analog **1**. This fluoresnce quenching and red shift of peak position from herring sperm DNA were also observed in the presence of the **2**, **3** and **4**.

Figure 1 Fluorescence spectra of interaction DNA and **1** (a: DNA, b: **1**, c: DNA + **1**)

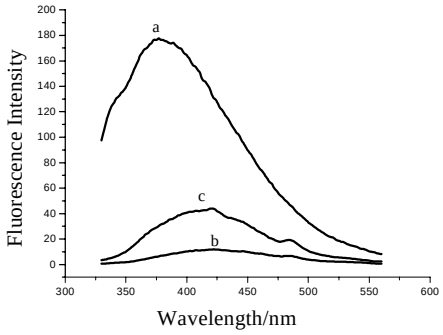
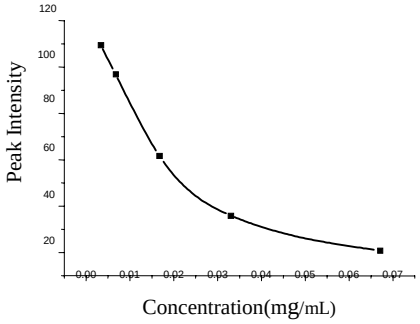


Figure 2 Effect of **1** concentration on the fluorescence intensity of DNA



In order to investigate the interaction between the distamycin analogs and herring sperm DNA, the fluorescence spectra of herring sperm DNA containing various concentration of the analog **1**, **2**, **3** and **4** were measured respectively. Changes of both fluorescence intensity and peak position were observed. As an example, the fluorescence peak intensity of the DNA as a function of concentration of analog **1** was shown in **Figure 2**. It can be seen that the peak intensity attenuated exponentially with the increasing of the analog concentration. The above phenomenon indicated there were interaction between herring sperm DNA and distamycin analogs. A detailed study of the pathways of fluorescence quenching is in progress in our laboratory.

Acknowledgments

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References

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