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DNA binding study of rhodamine B and its derivatives

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Food additives are substances added to food to preserve flavor or enhance its taste and appearance. Food coloring, or color additive, is any synthetic or natural dye, pigment or substance that imparts color when it is added to food or drink. Besides coloring food, food-dyes also show a several bioactivities. A lot of natural and synthetic dyes show antioxidant, antimicrobial and anticancer activity. We studied Rhodamine B (a common food dye in India) and its derivative with double stranded DNA structure using various biophysical techniques. All the derivatives bound with DNA showing the binding affinities in the order 105-106 M-1. Circular dichroic results suggested that the conformation of DNA was perturbed by all the derivatives. Fluorescence quenching studies gave evidence for groove binding mode. Isothermal titration calorimetry revealed that the binding was characterized by negative enthalpy and positive entropy changes. The overall binding affinity of the derivatives to the DNA revealed that other derivatives of Rhodamine bind strongly in comparison to Rhodamine B. The temperature dependence of the enthalpy changes afforded large negative values of heat capacity changes for the binding to ds DNA suggesting substantial hydrophobic contribution in the binding process. These results further advance our understanding on the binding of food dyes to DNA sequences.

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Epi-genetics and treatment planning for primary glioblastoma

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Background: To establish the frequency of MGMT and *RARβ* methylation in primary glioblastomas. We screened primary glioblastoma multiforme (GBM) in a population-based study for MGMT and *RARβ* methylation and correlated them with clinical data and treatment.

Results: MGMT methylation was detected in 13 of the 40 patients (32.5%). MGMT-promoter methylation did not correlate with overall survival (OS; $p>0.05$). RARB methylation was detected in 24 of the 40 patients (60%). The overall survival time of the patients with methylated RARβ was 19 months, and non-methylated RARB was 15 months. There was statically (OS; $p<0.05$) significance between the patients who were treated with chemotherapy and radiotherapy.

Conclusion: In summary, this study is suggested to the *RARβ* gene is also a new prognostic and predictive candidate marker for the primary GBM patients for choosing therapy strategy. Furthermore MGMT promoter methylation had no prognostic value and lower frequency in primary glioblastomas.

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