

Interaction of benzo[c]phenanthridine alkaloids with DNA

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Quaternary benzo[c]phenanthridine alkaloids are secondary metabolites of plant families *Papaveraceae*, *Rutaceae*, and *Ranunculaceae*. Extracts from these plants have been used in traditional Chinese medicine and therefore it attracted attention of pharmaceutical industry. Nowadays, two most abundant alkaloids are commercially available and thoroughly studied for antibacterial, anti-fungal, and potential anti-cancer activities. Much less abundant alkaloids were only recently available in amounts and purity that allow study of their properties at both biological and molecular level.

This work focuses on interaction of quaternary benzo[c]phenanthridine alkaloids with DNA – one of possible molecular targets in cells. Intrinsic fluorescence of alkaloids and its dependence on environmental conditions was studied. It was found that only one form of studied alkaloids interacts with DNA and this interaction is accompanied by decrease of fluorescence at ca. 420 nm and increase of fluorescence at ca. 600 nm. This dual fluorescence allows imaging of both free and bound form of DNA and together with fast cell membrane penetration allows quick staining of cells. Study of alkaloid-DNA interactions revealed dissociation constants in the micromolar range without specificity towards AT or GC basepairs in DNA.