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Binding interaction of *N*-acetylated Acridine Conjugate with *ct*-DNA and *β*-Cyclodextrin: Synthesis and Photophysical Studies

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ABSTRACT: in the present work we are reporting the synthesis and binding interaction of a saturated fatty acid containing 9-aminoacridine derivative (AC-PA) with *ct*-DNA and *β*-cyclodextrin (*β*-CD). From Steady-state fluorescence experiments this newly synthesized 9-aminoacridine derivative, AC-PA, shows more efficient binding interaction with *ct*-DNA as compared to the 9-aminoacridine (AC). The extent of interaction of AC-PA and AC with *ct*-DNA were find out by calculating the fluorescence quenching by using Stern–Volmer quenching equation. The calculated quenching constants of AC-PA and AC are $(4.5\pm0.5)\times10^{3}M^{-1}$ $(3.7\pm0.5)\times10^{3}M^{-1}$ respectively. The mechanism of fluorescence quenching of AC-PA and AC, were understand by using Stern–Volmer plots as well as time-resolved fluorescence experiments. The fluorescence quenching of AC-PA and AC by *ct*-DNA are static in nature and take place by formation of ground state complexes. The binding mode between AC-PA and AC were understand by DNA melting analysis experiment. The DNA melting analysis experiments were reveals that the binding interactions between fluorophores (AC-PA and AC) with *ct*-DNA are intercalative in nature. The melting temperature and mode of binding intercalative mode of binding between AC-PA and AC were further confirmed by DSC and CD experiments. The steady-state and time-resolved fluorescence parameters of AC-PA are quite sensitive towards the formation of inclusion complexes between AC-PA and *β*-CD**.** Long