Insight into the interaction of antitubercular and anticancer compound clofazimine with human serum albumin: spectroscopy and molecular modelling.

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Abstract:

The binding of clofazimine to human serum albumin (HSA) was investigated by applying optical spectroscopy and molecular docking methods. Fluorescence quenching data revealed that clofazimine binds to protein with binding constant in the order of 104 M-1, and with the increase in temperature, Stern-Volmer quenching constants gradually decreased indicating quenching mode to be static. The UV-visible spectra showed increase in absorbance upon interaction of HSA with clofazimine which further reveals formation of the drug-albumin complex. Thermodynamic parameters obtained from fluorescence data indicate that the process is exothermic and spontaneous. Forster distance (Ro) obtained from fluorescence resonance energy transfer is found to be 2.05 nm. Clofazimine impelled rise in -helical structure in HSA as observed from far-UV CD spectra while there are minor alterations in tertiary structure of the protein. Clofazimine interacts strongly with HSA inducing secondary structure in the protein and slight alterations in protein topology as suggested by dynamic light scattering results. Moreover, docking results indicate that clofazimine binds to hydrophobic pocket near to the drug site II in HSA.

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