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Study of Interaction of some Benzodiazepines with Human Serum Albumin by Fluorescent Method

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Fluorescence spectroscopy is one of the most effective methods for studying intermolecular interactions that reflect the change in the environment of a fluorophore. It helps to establish the binding of small molecules (drugs) to proteins. In the model physiological conditions, the interaction between certain benzodiazepines (BD) and human serum albumin (HSA) by fluorescence in combination with the method of ultraviolet spectroscopy was studied. The results of the experiment shows that the BD quench the intrinsic fluorescence of protein as a result of static interaction in the HSA - BD systems, which is confirmed by the shifts in the difference UV spectra of the HSA - BD and the reduction of binding constants for the HSA - BD systems with increasing temperature. The interaction parameters, such as the binding constant (KA), enthalpy change (ΔH^o) and entropy change (ΔS^o) were determined. The average distance (r) between DZP and tryptophan residue of HSA was calculated using theory of resonance energy transfer. It is established that the average distance between donor and acceptor molecules for HSA - BD systems is from 1.32 nm to 1.79 nm. Synchronous fluorescence spectra of BD at $\Delta\lambda = 60$ nm shows a bathochromic shift (from 3 nm to 6 nm), which indicates the presence of conformation changes of protein near the tryptophan residue.

Keywords: human serum albumin, fluorescence, benzodiazepines