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Insight into the interaction of human serum albumin with folic acid: a biophysical study

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Abstract. Folic acid (FA) is a water soluble bioactive food constituent from the vitamin B-family complex (B9). FA deficiency can lead to a variety of human health problems, while a high intake of FA can reduce the cytotoxicity of natural killer cells. The main goal of this study was to investigate the interaction of FA with human serum albumin (HSA) at physiological pH using ATR-FTIR, fluorescence spectroscopy, cyclic voltammetry and electrochemical impedance spectroscopy in order to understand the role of HSA as a blood transporter for FA in aqueous solution that can be used in different therapies. The quenching of HSA in the presence of FA was followed and the binding constant (K_b) was determined. The variation of electrochemical parameters proved that the FA binds to immobilized HSA and the binding constant was ten times than the value obtained when the interaction takes place between free molecules in solution when studied by fluorescence quenching. The results can be used in future studies to improve drug delivery systems or cellular uptake of folic acid and food components conjugated to HSA nanoparticles or nanocapsules.

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