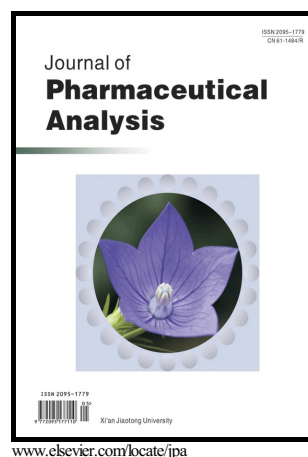


Author's Accepted Manuscript

Binding interaction of phosphorus heterocycles with bovine serum albumin: A biochemical study

Swarup Roy, Raj Kumar Nandi, Sintu Ganai, K.C. Majumdar, Tapan K. Das



PII: S2095-1779(16)30054-5
DOI: <http://dx.doi.org/10.1016/j.jpha.2016.05.009>
Reference: JPHA321

To appear in: *Journal of Pharmaceutical Analysis*

Received date: 16 February 2016
Revised date: 24 May 2016
Accepted date: 30 May 2016

Cite this article as: Swarup Roy, Raj Kumar Nandi, Sintu Ganai, K.C. Majumda and Tapan K. Das, Binding interaction of phosphorus heterocycles with bovine serum albumin: A biochemical study, *Journal of Pharmaceutical Analysis* <http://dx.doi.org/10.1016/j.jpha.2016.05.009>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Binding interaction of phosphorus heterocycles with bovine serum albumin: A biochemical study

Swarup Roy^a, Raj Kumar Nandi^b, Sintu Ganai^b, K.C. Majumdar^{b*}, Tapan K. Das^{a*}

^aDepartment of Biochemistry and Biophysics

^bDepartment of Chemistry, University of Kalyani, Kalyani - 741235, West Bengal, India

tapankumardas175@gmail.com

kcmklyuniv@gmail.com

*Corresponding author.

Abstract

Interaction between bovine serum albumin (BSA) and phosphorus heterocycles (PHs) was studied using multi-spectroscopic techniques. The results indicated the high binding affinity of PHs to BSA as it quenches the intrinsic fluorescence of BSA. The experimental data suggested the fluorescence quenching mechanism between PHs and BSA as a dynamic quenching. From the UV-vis studies, the apparent association constant (K_{app}) was found to be 9.25×10^2 , 1.27×10^4 and 9.01×10^2 L/mol for the interaction of BSA with PH-1, PH-2 and PH-3 respectively. According to the Förster's non-radiation energy transfer (FRET) theory, the binding distances between BSA and PHs have been calculated. The binding distances (r) of PH-1, PH-2 and PH-3 were found to be 2.86, 3.03, 5.12 nm, respectively indicating energy transfer occurs between BSA and PHs. The binding constants of the PHs obtained from the fluorescence quenching data were found to be decreased with increase of temperature. The negative values of the thermodynamic parameters ΔH , ΔS and ΔG at different temperatures revealed that the binding process is spontaneous; hydrogen bonds and van der Waals interaction were the main force to stabilize the complex. The micro-environment of the protein-binding site was studied by synchronous fluorescence and circular dichroism (CD) techniques and data indicated that the conformation of BSA changed in the presence of PHs. Finally, we studied the BSA-PHs docking using auto dock and results suggest that PHs is located in the cleft between the domains of BSA.

Keywords: BSA; Interaction; Spectroscopy; PHs; Docking.

Introduction

Download English Version:

<https://daneshyari.com/en/article/8521305>

Download Persian Version:

<https://daneshyari.com/article/8521305>

[Daneshyari.com](https://daneshyari.com)