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Interaction of 6-mercaptopurine with bovine serum albumin and displacement from the binding sites by quercetin and rutin

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Background and Aims: In the present study, binding characteristics of 6-mercaptopurine (6MP) with bovine serum albumin (BSA) together with its displacement from its binding site by quercetin and rutin have been investigated by different spectroscopic methods.
Methods: A 3 mL solution of 0.01 mM BSA was titrated by addition of different concentrations of 6MP. The fluorescence emission spectra were recorded in a wavelength range of 250–500 nm at 293, 300, 308 and 315 K. The displacement experiments were carried out in the presence of a certain concentration of quercetin, rutin or ibuprofen (0.01 mM).
Results: A static quenching component in overall dynamic quenching process is operative in the interaction between 6MP and BSA. The synchronous fluorescence spectroscopy study revealed that the secondary structure of BSA is changed in the presence of 6MP and both Tyr and Trp residues participate in the interaction between 6MP and BSA with the later one being more dominant. Quercetin and Ibuprofen, opposite of rutin competed with 6MP for binding to BSA and could displace the drug from its binding site on BSA.
Conclusions: There are a single binding site and hydrophobic interaction between 6MP and BSA. In addition, the displacement study showed that 6MP is located in site II of BSA.

Keywords: 6-Mercaptopurine; Bovine serum albumin; Binding constant; Fluorescence spectroscopy; Quercetin; Rutin