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Human serum albumin as chiral selector in enantioselective HPLC

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Enantioselective high-performance liquid chromatography (eHPLC) using chiral stationary phases (CSPs) is surely the most used technique for the determination of the enantiomeric excess (e.e.) of chiral drugs, a fundamental parameter for reliable studies on the relationship between stereochemistry and pharmacological activity. A key aspect of this enantioseparation technique is the efficiency of the chiral selector, which can be optimized to obtain higher selectivity and a wider applicability. Thus, the determination of the mechanisms behind chiral recognition is very important to predict and improve the enantioselectivity of CSPs.

The present poster reviews the use of human serum albumin (HSA) as a chiral selectors in eHPLC, with particular emphasis on the modulation of the chromatographic performance of CSPs based on HSA. HSA CSPs allow relatively easy predictions of the chiral discrimination mechanisms and the possibility to improve the selectivity of enantioresolution by modulating the binding process, using either reversible or covalent modifications of the protein. Significant improvements of the chromatographic parameters, such as reduction of analysis time and increase of enantioselectivity, have been obtained for selected analytes by using competitors for a particular binding site of HSA dissolved in the mobile phase or by selectively modifying the protein structure at single amino acid residues.