

Supporting Information for

Interactions of cucurbit[6,7]urils with human serum albumin and their effects on zaltoprofen transportation

Shanshan Li, Jiawei He, Yanmei Huang, Qing Wang, Hongqin Yang, Kailin Xu, and Hui Li*

College of Chemical Engineering, Sichuan University, Chengdu 610065, PR China

1. CB[6] and CB[7] preparation

10 g glycoluril was stirred with 14.2 mL 37% HCl solution in a 50 mL round-bottomed flask. Then finely powdered paraformaldehyde (4.22 g) was slowly added. After 30 min vigorous stirring, the viscous solution set as a gel, which was then refluxed for 18 h at 100 °C. The reaction mixture was cooled down to room temperature to allow crystals forming. The CB[6] was obtained by filtrating the crystals, washing using plenty of water and drying under 100 °C for 48 h.

To further separate CB[7], ~ 40 mL water was added to the filtrate and allowed insoluble CB[*n*]s and impurities precipitating. Then CB[7] dissolved filtrate was reduced to 10 mL and 80 mL methanol was added causing immediate formation of a white precipitate (Crude CB[7]). The precipitate was filtered and suspended in 200 mL of 20% aqueous glycerol and the solution was heated to 80 °C under stirring for 3 h. The mixture was then filtered and 200 mL methanol was added into the colorless solution and stirred overnight. The white precipitate was formed and suction filtered using 0.45 μm membrane with plenty of methanol. Finally, the solid (CB[7]) was dried under 100 °C for 48 h.

* Corresponding author. Tel.: +86 028 85405149; fax: +86 028 85401207.
E-mail addresses: lihuilab@sina.com (H. Li).

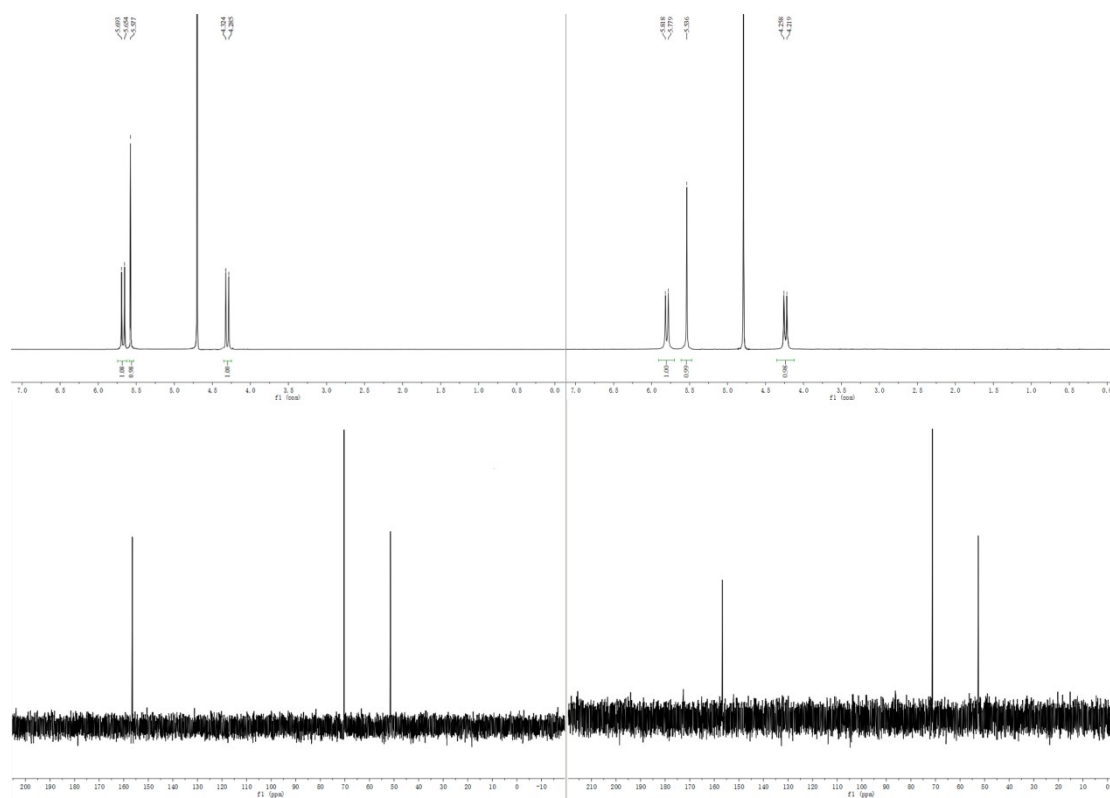
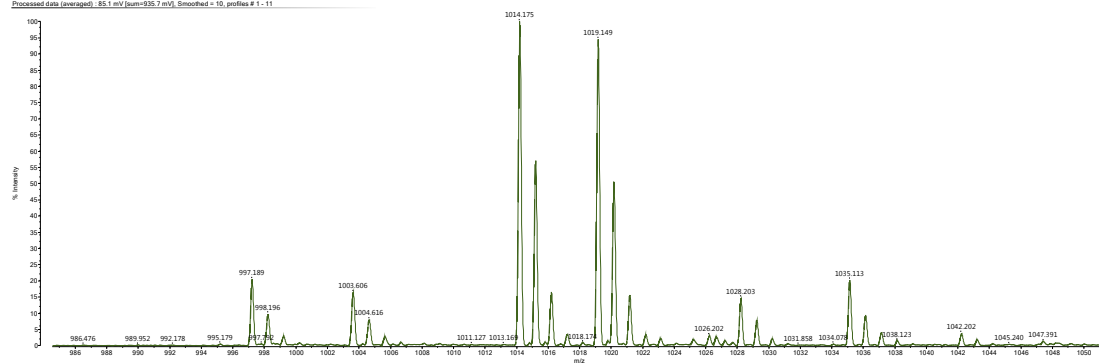


Fig. S1. The ^1H and ^{13}C NMR spectra of the synthetic CB[6] (left) and CB[7] (right) in D_2O .

Data: 6,0003_25 March 2016 17:46:33 Cal/Refiling Calibration by Engineer on 25 March 2016 17:45:01 (Original)
 Shimadzu MALDI 7000, Tuning Reflectron MS, Power 50, P.E.t at 1000.00 (bin 175), Ion Gate Blanking: 500.00, Laser Diameter: 100
 Processed data (averaged): 85.1 mV (sum=935.7 mV), Smoothed = 10, profiles # 1 - 11



Data: 7,0003_25 March 2016 17:47:38 Cal/Refiling Calibration by Engineer on 25 March 2016 17:45:01 (Original)
 Shimadzu MALDI 7000, Tuning Reflectron MS, Power 100, P.E.t at 1000.00 (bin 175), Ion Gate Blanking: 500.00, Laser Diameter: 100
 Processed data (averaged): 8.5 mV (sum=843.9 mV), Smoothed = 10, profiles # 1 - 99

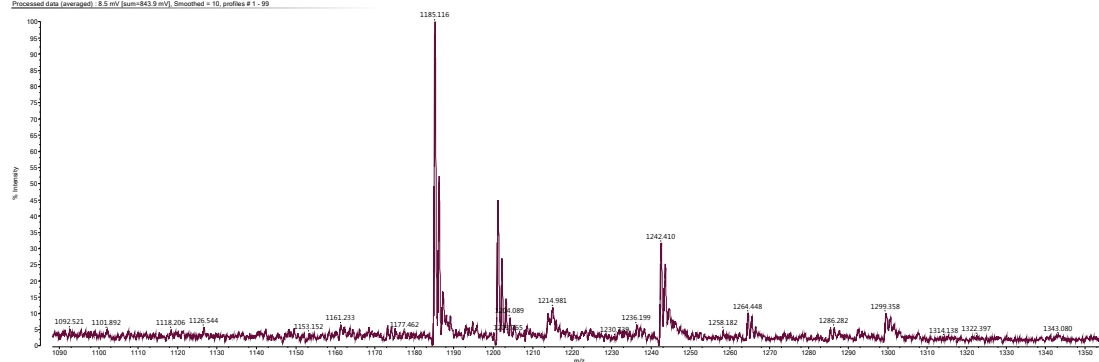


Fig. S2. The MALDI-TOF-MS of the synthetic CB[6] (top) and CB[7] (down).

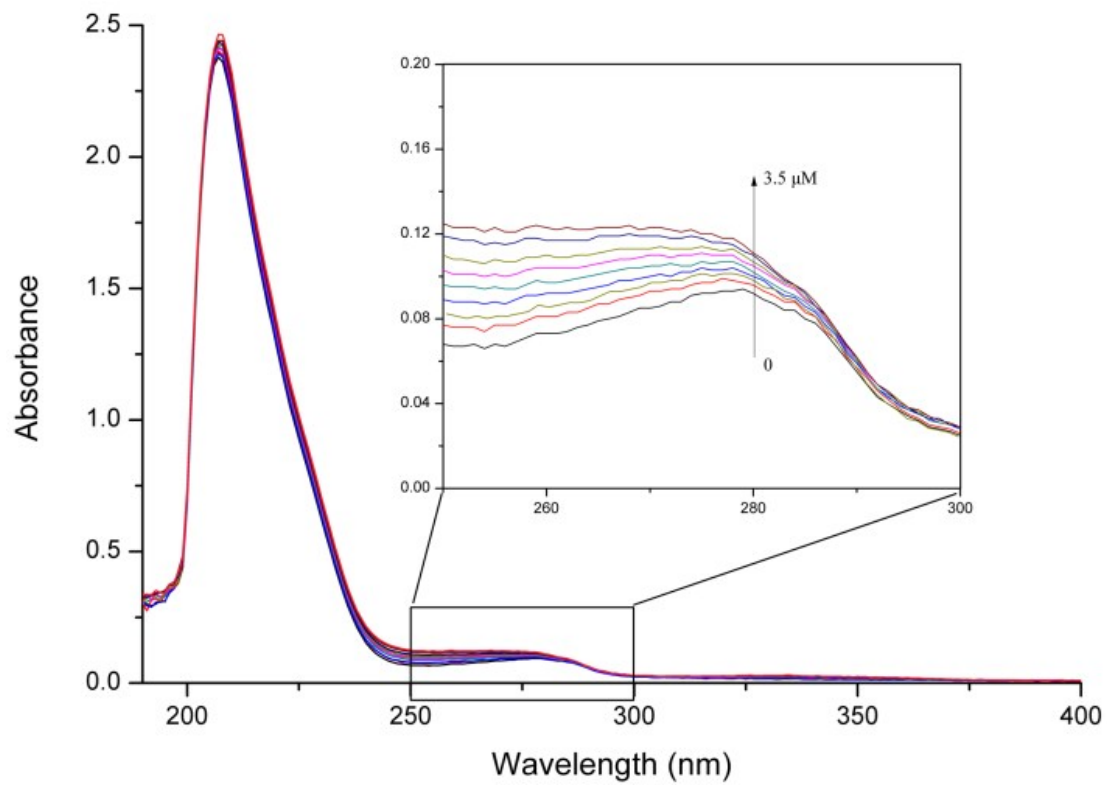


Fig. S3. The UV-vis absorption spectra of HSA in various concentrations of ZPF for inner-filter effect correction.

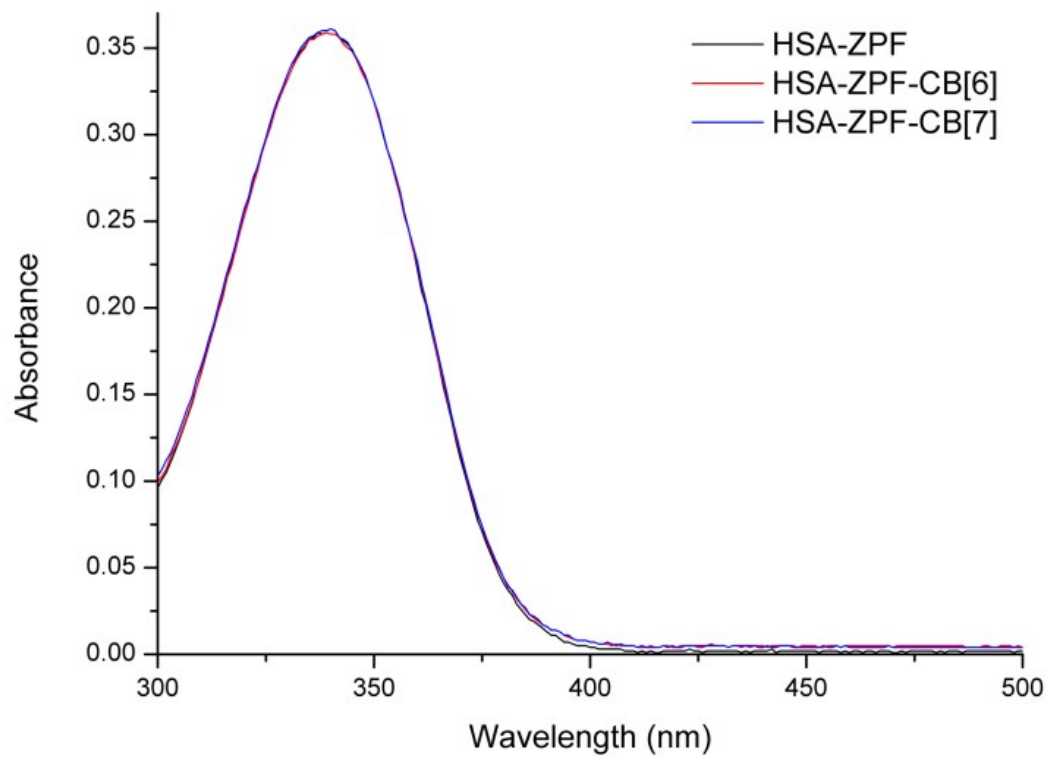


Fig. S4. The UV-vis absorption spectra of HSA in the presence of ZPF and further added by CB[6,7]s.

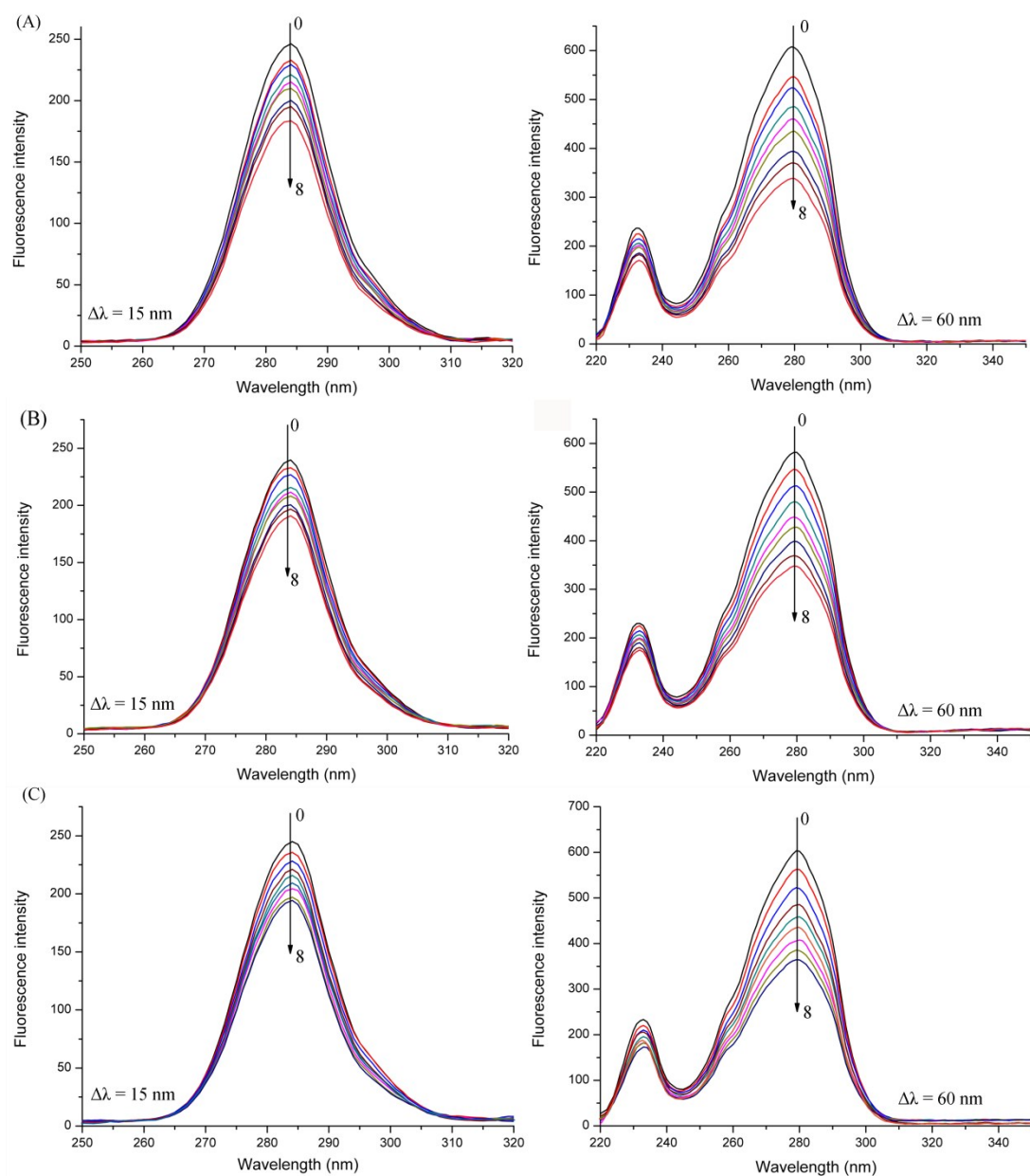


Fig. S5. The synchronous fluorescence spectra of HSA (2.0×10^{-6} M) with various amounts of ZPF in the absence and presence of CB[6] and CB[7] (1.0×10^{-4} M) at $\Delta\lambda = 15$ nm and $\Delta\lambda = 60$ nm. (0–8 correspond to $[ZPF] = 0, 0.4, 0.8, 1.2, 1.6, 2.0, 2.5, 3.0,$ and 3.5×10^{-6} M; $T = 298$ K).

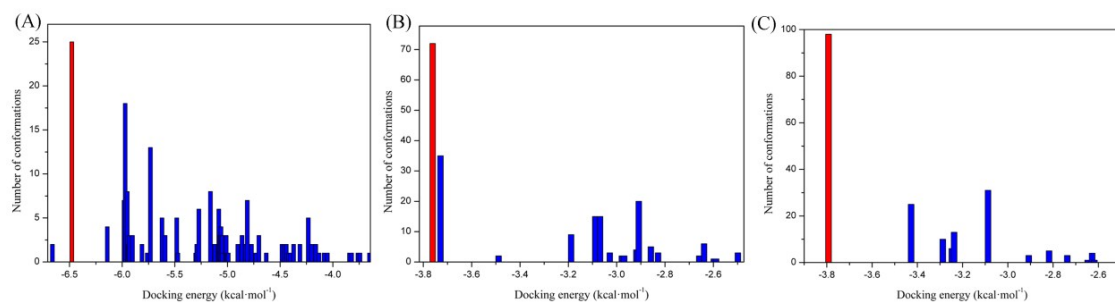


Fig. S6. Cluster analysis of 200 AutoDock docking runs of (A) ZPF binding with HSA; (B) CB[6] binding with HSA; and (C) CB[7] binding with HSA. (The red clusters represent the most favorable conformations considering the highest populated cluster with lower binding energy.)

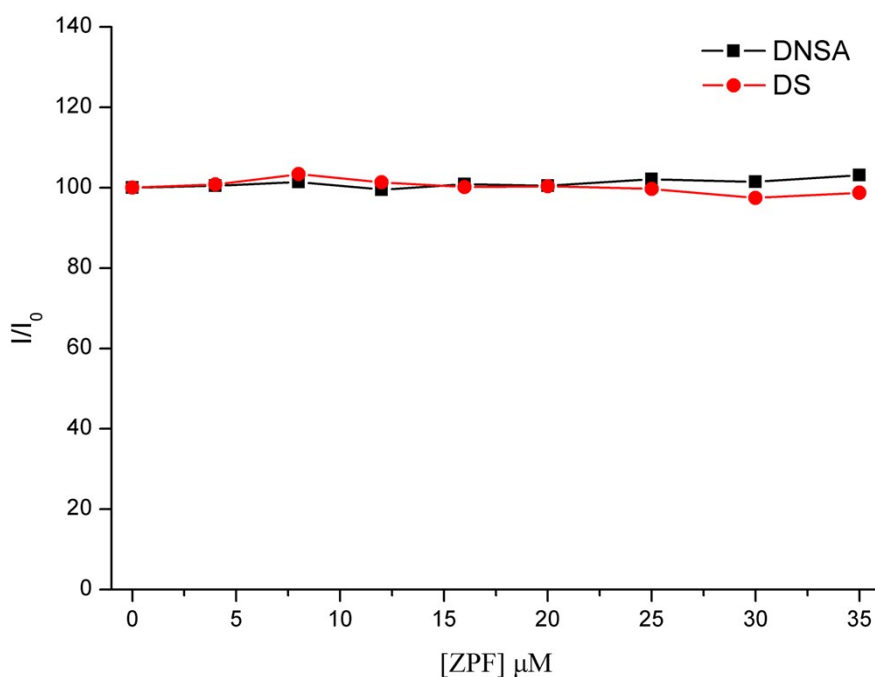


Fig. S7. Changes in DNSA (site I probe) and DS (site II probe) fluorescence elicited by ZPF addition to previously formed chromophore-HSA complexes. Experiments were carried out at pH 7.4 and complexes were preformed employing HSA (2 μM) and DNSA or DS (20 μM). λ_{ex} : 350 nm, λ_{em} : 540 nm for DNSA and 480 nm for DS.