Polymer drug carriers based on N-(2-hydroxypropyl) methacrylamide (HPMA) copolymers, which have cholesterol moieties and anti-cancer drug bound via cleavable bond, have been studied extensively over the past few years, to understand the self-assembly in dilute aqueous solutions [1,2]. Above a certain concentration, micelle-like nanoparticles (NPs) having ellipsoidal shape are observed. However, there is a lack of knowledge on the behavior of these drug carriers in human blood environment.

We use synchrotron small angle X-ray scattering (SAXS) to investigate HPMA copolymers that are dissolved in an aqueous solution of human serum albumin (HSA), as a step on the way to the blood environment, to reveal the interaction between the NPs and HSA. We find that the size of the NPs is reduced when HSA is present. We suggest that some of the cholesterol moieties from HPMA copolymer bind to HSA and are removed from the nanoparticles, which changes their size and shape.

Figure 1 a) SAXS curves of HPMA copolymers ($M_w = 33290$ g/mol, with 2 mol% cholesterol) having a concentration of 2 mg/ml in HSA solution of various concentrations. b) HSA interacts with the NPs by forming complex with the NPs (top) or removing cholesterol groups from the NP core (bottom).

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