Supplementary Material (ESI) for Chemical Communications

Electronic Supporting Information for the article:

Competitive Analysis of Saccharides or Dopamine by Boronic Acid - Functionalized CdSe/ZnS Quantum Dots

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Materials:

Ultrapure water from NANOpure Diamond (Barnstead Int., Dubuque, IA) source was used throughout the experiments. Hops Yellow Core Shell EviDots, CdSe/ZnS Quantum dots in toluene were purchased from Evident Technologies. Bis(Sulfosuccinimidyl) suberate (BS^3) was purchased from Pierce Biotechnologies. All others chemicals were purchased from Sigma-Aldrich.

Preparation of GSH capped QDs:

QDs were precipitated from the toluene solution by addition of 2 ml methanol to 0.5 ml of QDs in toluene, followed by centrifugation for 5 minutes at 3000 rpm. The resulting precipitate was dissolved in 1 ml chloroform, to which was added a 200 μl of a glutathione, GSH, solution (containing 0.142 gr GSH and 40 mg KOH in 2 ml methanol) and the resolting mixture was shaken. After the addition of 1.5 ml of 1 mM NaOH solution in water, all particles were transferred to the water phase. The QDs solution was separated from the chloroform by centrifugation for 1 min. The excess of GSH was removed by two successive precipitation steps of QDs, using NaCl and methanol followed by centrifugation. The resulting QDs were dissolved in 400 μl of a 10 mM HEPES buffer, (pH=7.4).

Preparation of 3-Aminophenyl boronic acid-capped QDs:

To 1 nmol of GSH-capped QDs were added 100 μl of a Bis(Sulfosuccinimidyl) suberate, BS^3, stock solution (1 mg/ml) and the mixture was shaken for 15 min. The QDs were purified by precipitation, and dissolved in 10 mM HEPES buffer (pH=7.4) to which was added 1 mg of 3-aminophenyl boronic acid, and then the solution was shaken for 1.5 hours. The excess of the boronic acid ligand was removed by two successive precipitation steps, and the purified particles were dissolved in 10 mM phosphate buffer (pH=7.4).

Preparation of ATTO-590-modified Galactosylamine/Dopamine:

To 0.5 mM Galactosylamine/Dopamine (10 mM HEPES buffer pH=7.4) was added 1 mM of ATTO-590 N-hydroxysuccinimidylester (NHS ester) dye, and the solution was shaken for 2 hours. The resulting dye-labeled galactose / dopamine were analyzed by ^{1}H-NMR, TLC, and HPLC-MS.