Supporting Information

Protein Corona Formed from Different Blood Plasma Proteins Affects the Colloidal Stability of Nanoparticles Differently

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Table S1. Protein:AuNP incubation ratios for the transport related proteins (ApoA1 and HSA) and immune related proteins (IgG and FBG) used to investigate how different protein:AuNP ratios for different proteins affect the hydrodynamic diameter and aggregation of the AuNPs at physiological pH.

ApoA1:AuNP	0, 2.1, 4.2, 6.3, 8.5, 10.6, 12.7, 19.0, 25.3
HSA:AuNP	0, 3, 6, 9, 12, 15, 18, 30, 60, 90, 120
IgG:AuNP	0, 2, 4, 6, 8, 10, 12, 20, 30, 50, 70, 90
FBG:AuNP	0, 0.4, 0.8, 1, 4, 6, 8, 10, 12, 15, 20, 25, 30, 50, 70, 90

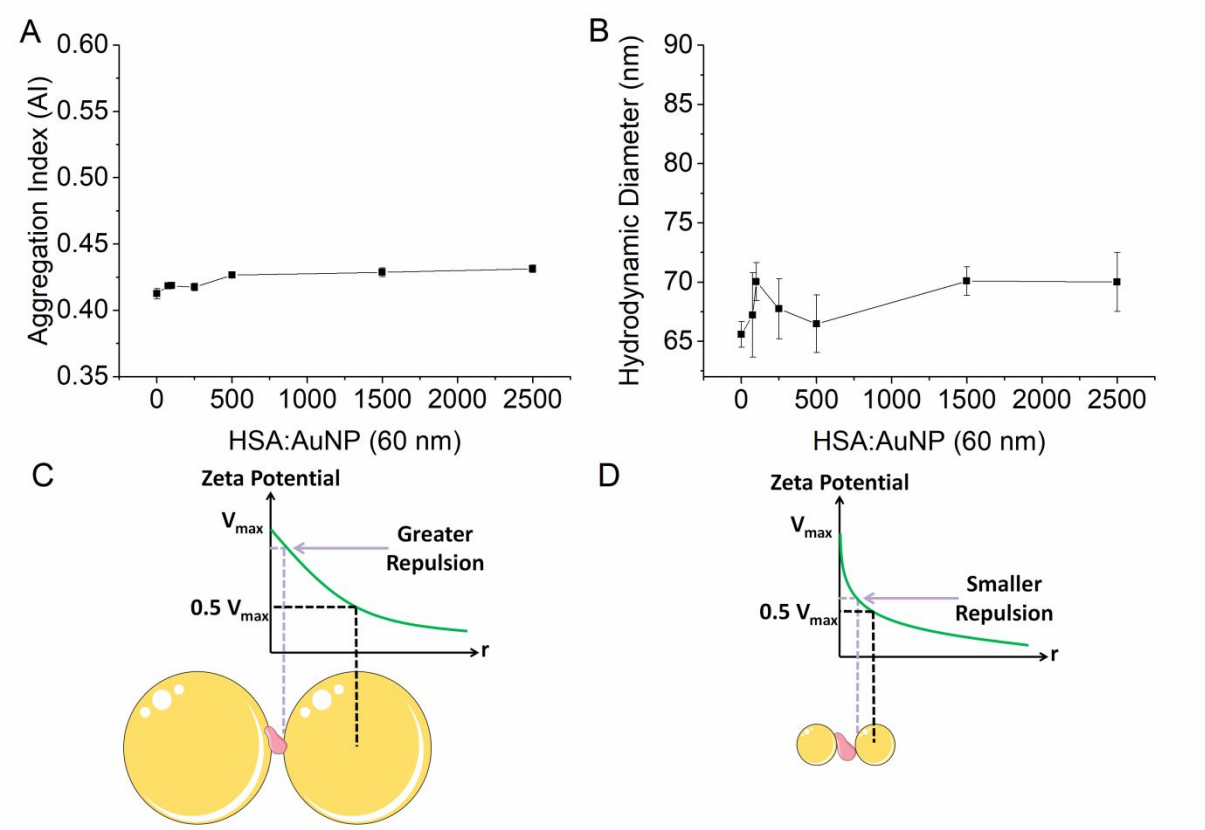

Figure S1. (A) AI, and (B) hydrodynamic diameter, D_H of 60 nm citrate-capped AuNPs at different HSA:AuNP incubation ratios, after incubating the AuNPs with HSA for 24 h at 37 °C in physiological pH of 7.4. No significant changes in AI or D_H were observed at all ratios. (C) This was likely due to the significantly smaller size of HSA compared to the 60 nm AuNPs, which would result in greater repulsion between adjacent 60 nm AuNPs bridged by the HSA molecule (Zeta potential curve illustrated belongs to the AuNP on the left. For reference, 0.5 V_{max} is taken to occur at the centre of the adjacent AuNP). (D) This is in contrast to the smaller 20 nm AuNPs of comparable size to HSA where the inter-particle distance bridged by HSA resulted in a smaller repulsion force and hence energetically more favorable aggregated state (Zeta potential curve illustrated belongs to the AuNP on the left. For reference, 0.5 V_{max} is taken to occur at the centre of the adjacent AuNP).

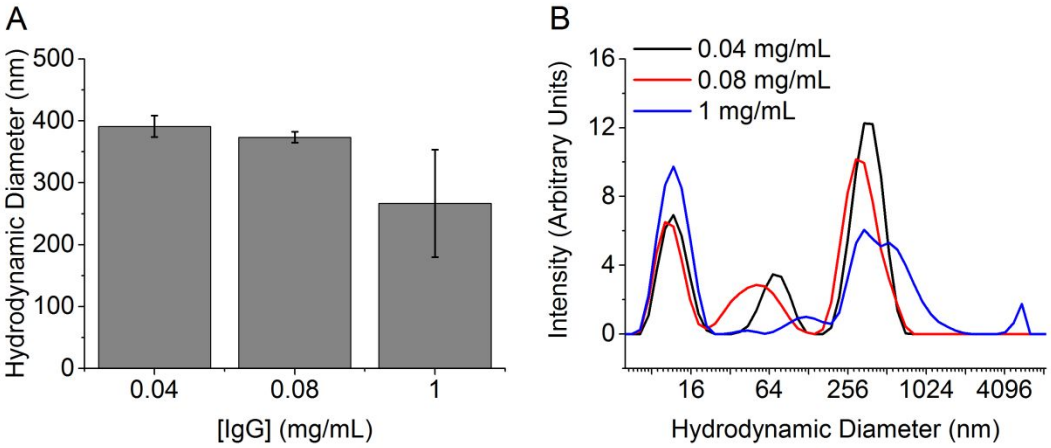

Figure S2. (A) Average hydrodynamic diameter (D_H) as given by the Z-average and (B) histogram distributions of D_H of 0.04, 0.08, and 1 mg/mL free IgG in 10 mM sodium phosphate buffer. The free IgG concentration of 0.08 mg/mL is comparable to the IgG concentration at IgG:AuNP = 90 used in this study.

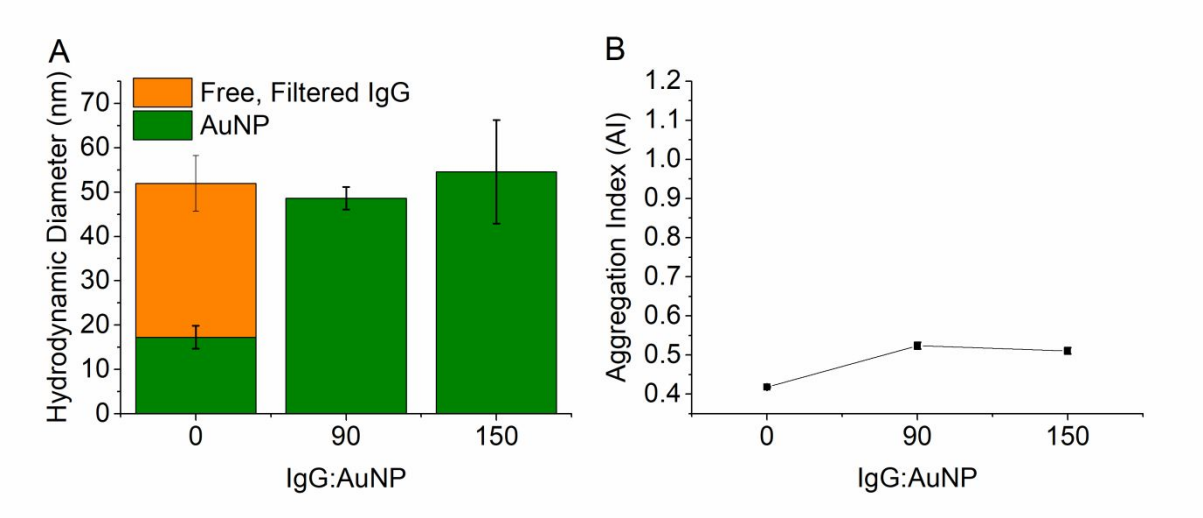

Figure S3. (A) Average hydrodynamic diameter (D_H) of 20 nm citrate-capped AuNPs after incubation with IgG at high IgG:AuNP ratios of 90 and 150 for 24 h at 37 °C in physiological pH of 7.4 (green bars). The IgG was subsequently filtered with 200 nm pore size syringe filters to remove IgG agglomerates before incubating with AuNPs again. The resulting ΔD_H of the AuNP-IgG complex at incubation ratios of 90 and 150 were comparable to the size of the filtered, free IgG molecules (orange bar), thus suggesting the formation of an IgG monolayer on the surface of the 20 nm AuNPs. (B) Corresponding AI of the AuNP-IgG complex at high IgG:AuNP ratios indicating minimal aggregation of AuNPs as the IgG formed a steric layer around the AuNPs.

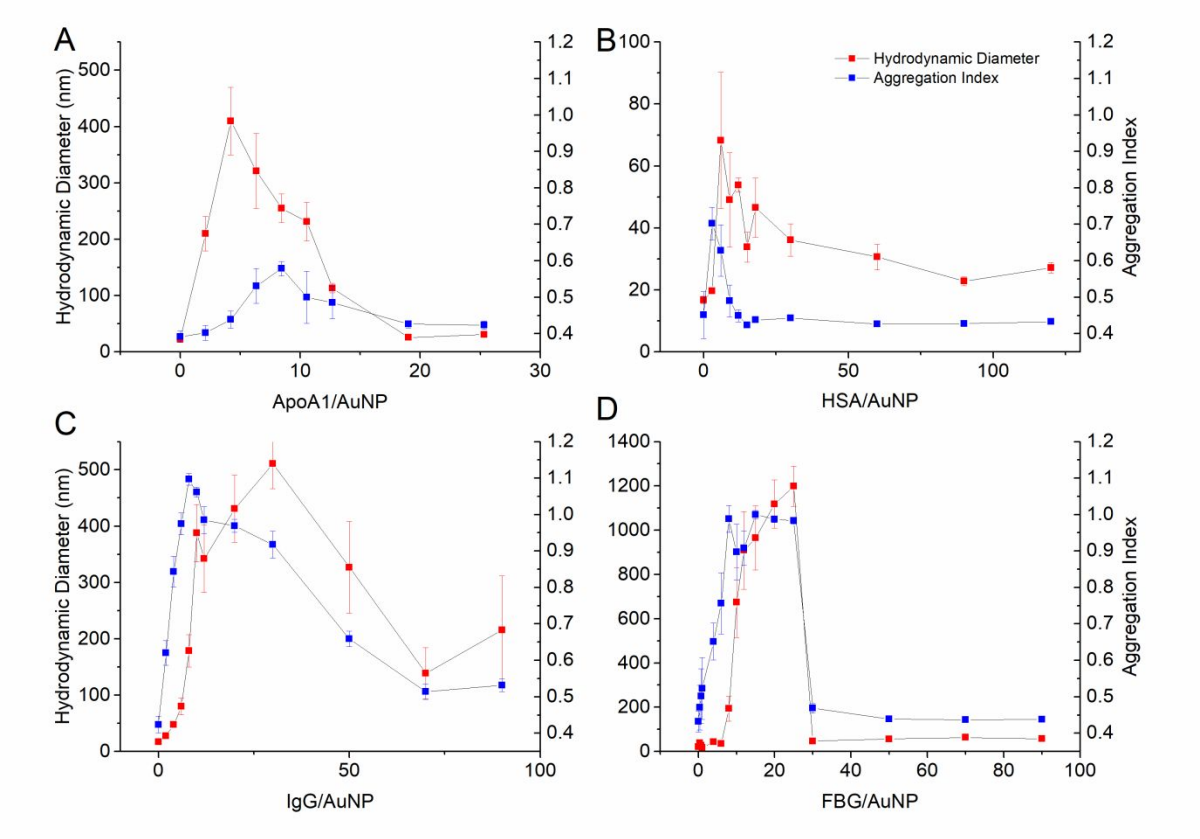

Figure S4. Juxtaposing the plots of AI against protein:AuNP incubation ratio in Figure 2 and D_H against protein:AuNP incubation ratio in Figure 3 of the main manuscript together for (A) ApoA1; (B) HSA; (C) IgG; and (D) FBG. The changes in AI corresponded well to changes in D_H, suggesting that the increase in D_H observed in Figure 3 was largely contributed by the aggregation of AuNPs induced by the non-specific adsorption of proteins.