Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary information

Exploiting the biomolecular corona: Pre-coating of nanoparticles enables controlled cellular interactions

Johanna Simon[a,b,1], **Laura K. Müller**[b], **Maria Kokkinopoulou**[b], **Ingo Lieberwirth**[b], **Katharina Landfester**[b], **Svenja Morsbach**[b], **Volker Mailänder**[a,b*]

[a] Dermatology Clinic, University Medical Center of the Johannes Gutenberg-University Mainz, Langenbeckstr. 1, 55131 Mainz, Germany.

[b] Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany.

*Corresponding author

Content

1 . LC-MS analysis

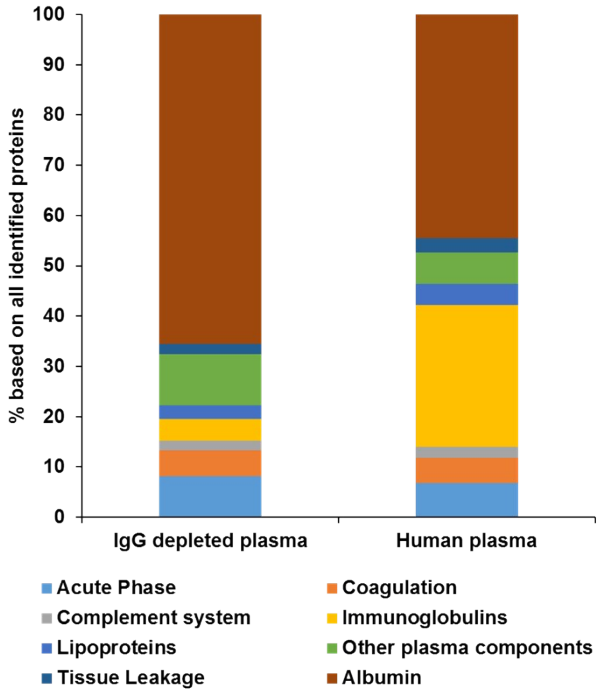


Figure S 1. LC-MS analysis of human plasma and IgG depleted plasma. Proteins were classified into 8 different classes according to their biological function. Values are given in % based on all identified proteins. A full list of all identified proteins is supplemented in a separate Excel File Table S 1.

Table S1. All identified proteins for plasma, IgG depleted plasma and after corona formation are summarized in a separate Excel File giving their relative abundance in % and the absolute amount in fmol.

2. Physico-chemical characterization of nanoparticles

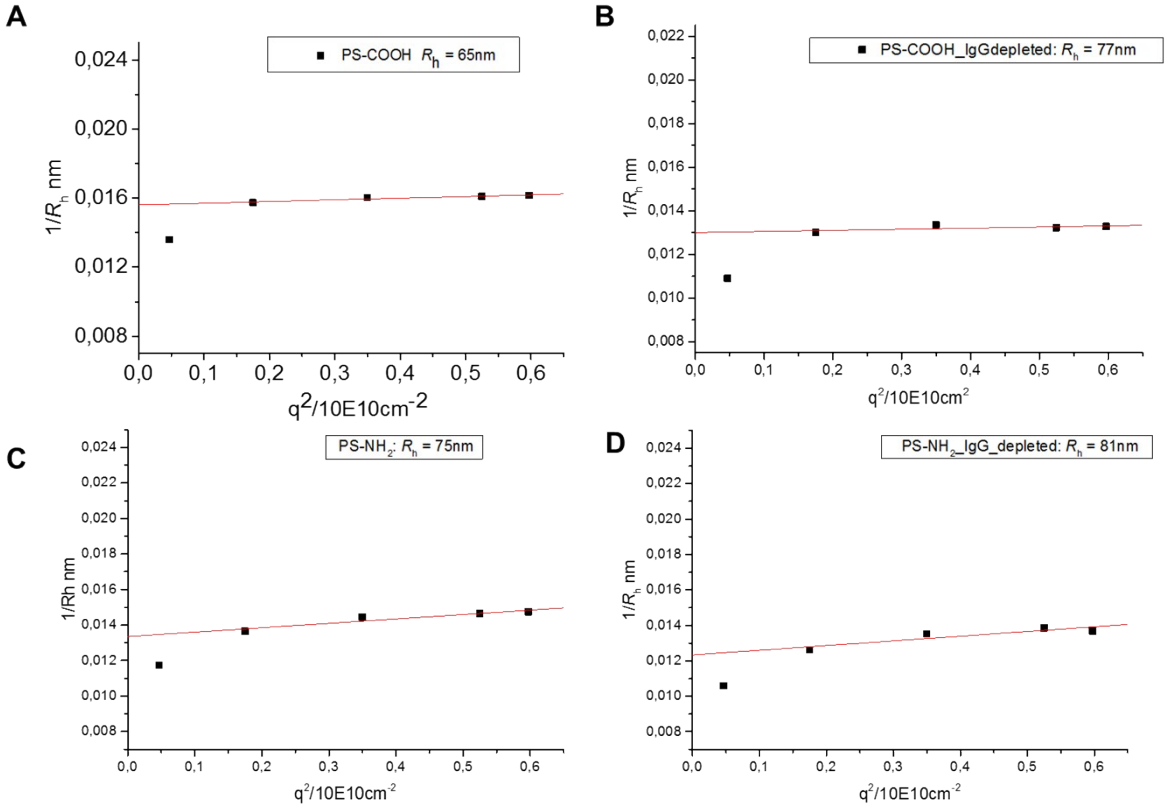
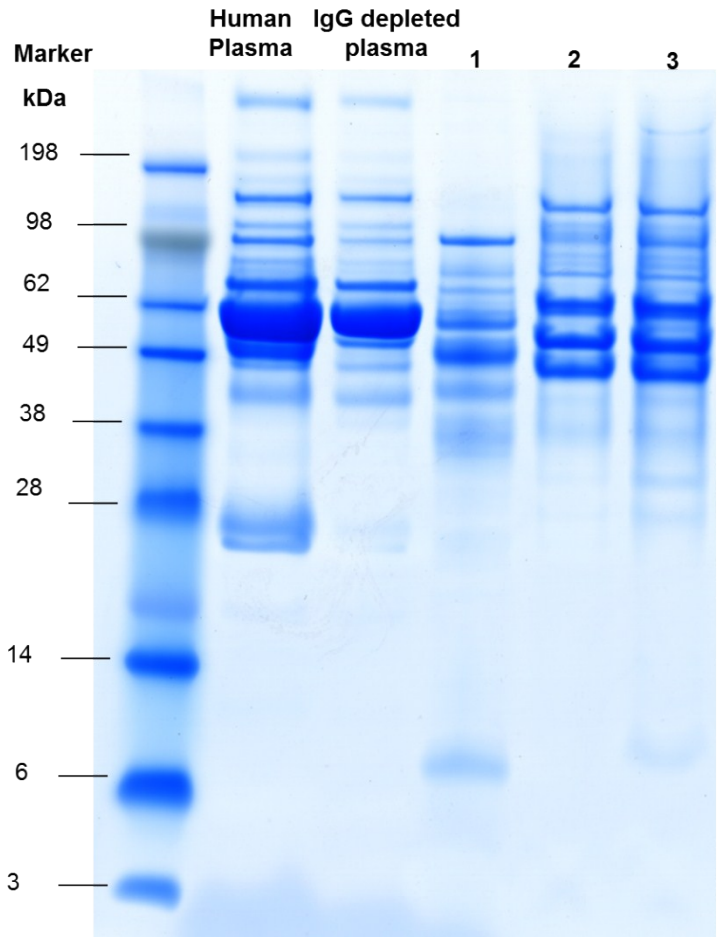


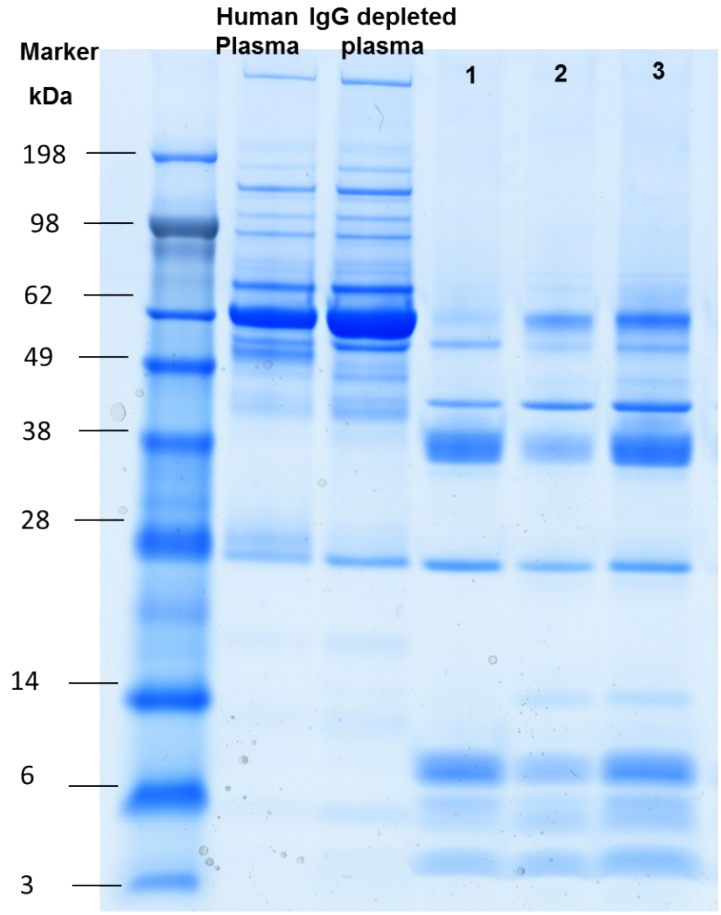
Figure S 2. Multi-angle dynamic light scattering (DLS) analysis. Angular dependency of the hydrodynamic radius R_h for uncoated (A, C) and pre-coated (B, D) nanoparticles. PS-COOH are shown in (A, B) and PS-NH_2 in (C, D).

3. Qualiatitive and quantitative analysis of the protein corona



1	Human Plasma
2	Coated with IgG depleted plasma
3	Coated and exposed to human plasma

Figure S 3. SDS PAGE analysis of the hard corona pattern of PS-COOH nanoparticles. Human plasma and IgG depleted plasma serve as a reference. PS-COOH nanoparticles were incubated with human plasma (1), coated with IgG depleted plasma (2) or pre-coated and re-exposed to human plasma (3). The hard corona was isolated via repetitive centrifugation and redispersion as described in the material/methods part below.



1	Human Plasma
2	Coated with IgG depleted plasma
3	Coated and exposed to human plasma

Figure S 4. SDS PAGE analysis of the hard corona pattern of PS-NH_2 nanoparticles. Nanoparticles were incubated with human plasma (1), coated with IgG depleted plasma (2) or pre-coated and re-exposed to human plasma (3). The hard corona was isolated as described in the material/methods part below.

Table S 2. Protein quantification via Pierce Assay of the hard protein corona. Values are given in mg per m^2 NP surface area ± s.d. of three independent experiments.

in mg/m²	**Human Plasma**	**IgG depleted plasma**	**Coated and exposed to human plasma**
PS-COOH	1.30 ± 0.13	3.10 ± 0.22	4.20 ± 0.47
PS-NH2	0.96 ± 0.03	0.51 ± 0.08	1.06 ± 0.04

4. Investigating corona formation via ITC and DLS

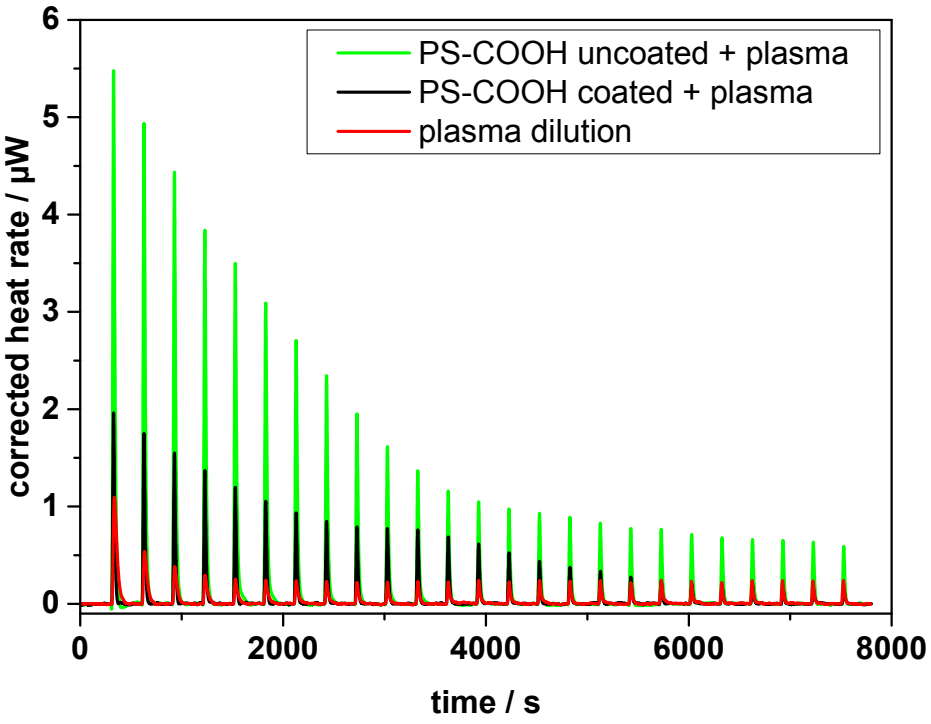


Figure S 5. Corrected heat rates of isothermal titration calorimetry experiments (ITC) experiments. The plasma dilution describes the titration of plasma into water and was subtracted from the adsorption measurements after integration.

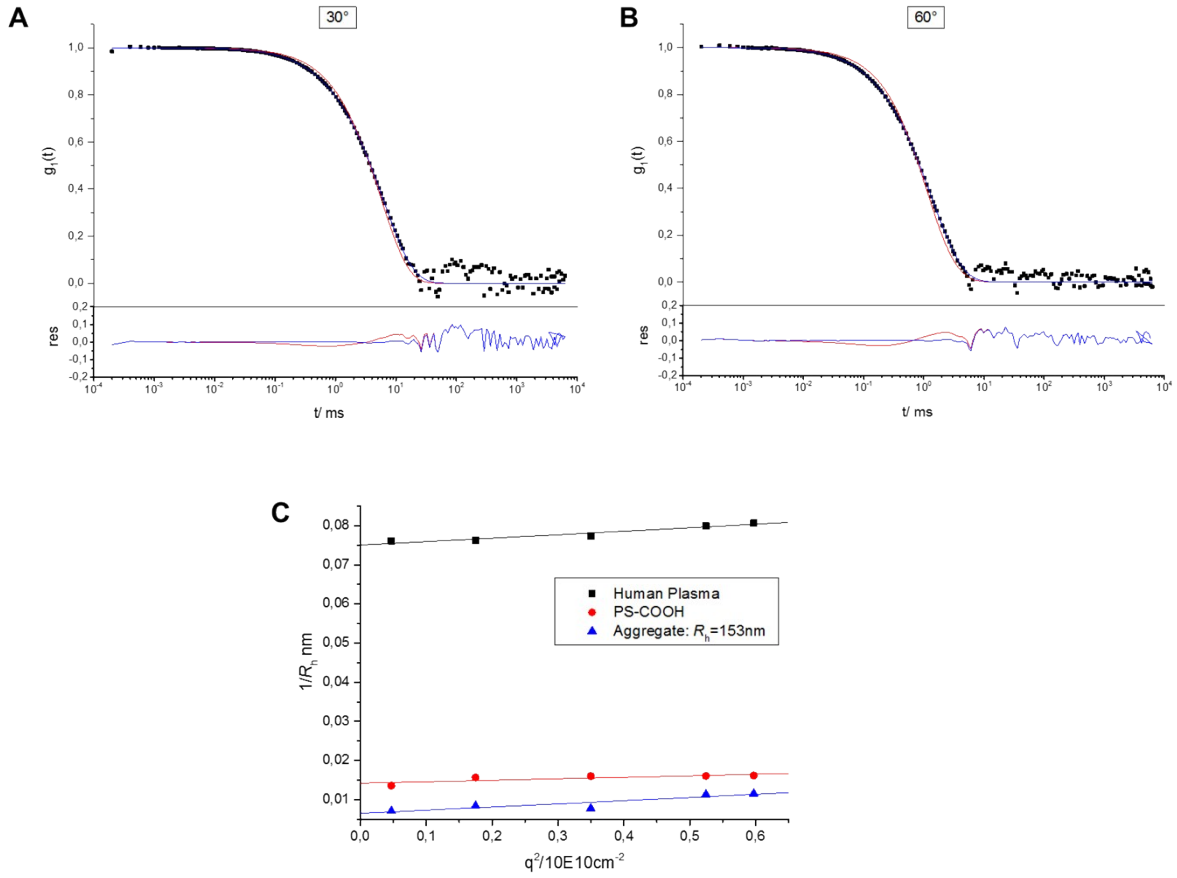


Figure S 6: Multi-angle dynamic light scattering analysis: *Upper graph:* Autocorrelation function $g_1(t)$ (black circles) of PS-COOH nanoparticles incubated with human plasma at a scattering angle θ = 30° (A) or θ = 60° (B). The red line (–) represents the forced fit and the blue line (–) represents the fit with an additional aggregation term. *Lower graph:* Difference between the data and the two fits. C) Angular dependency of the hydrodynamic radius R_h of PS-COOH nanoparticles (red), human plasma (black) and the aggregated formed in plasma (red).

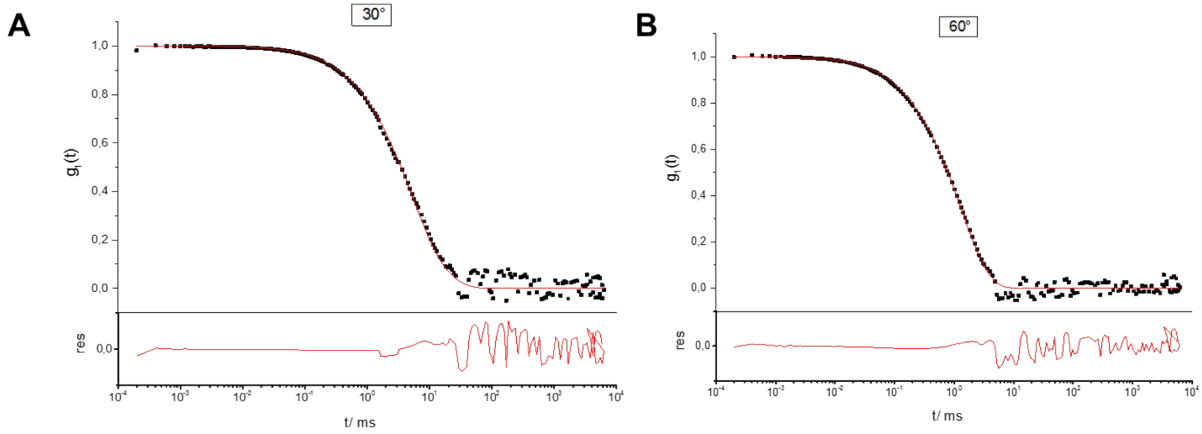


Figure S 7. Multi-angle dynamic light scattering analysis: *Upper graph:* Autocorrelation function $g_1(t)$ (black dots) of pre-coated PS-COOH nanoparticles incubated with human plasma at a scattering angle θ = 30° (A) or θ = 60° (B). The red line (–) represents the forced fit. There is no additional aggregation term needed indicating that the pre-coated nanoparticles remain stable in human plasma.