Supporting Information

Controlling protein interactions in blood for effective liver immunosuppressive therapy by silica nanocapsules

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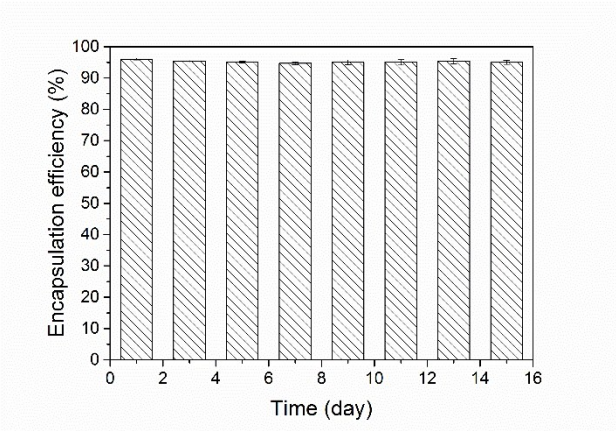


Figure S1. Encapsulation efficiency of DXM in SiO_2 NCs after dialysis for 15 days. The dialysis systems were incubated at 37 °C. Concentrations of DXM in the dialysis media were measured by UV-Vis spectroscopy.

Table S1. Encapsulation efficiency, hydrodynamic diameters D_h, and ζ-potential of SiO_2 NCs loaded with various amounts of DXM and stabilized by CTMA-Cl or Lutensol AT50 (LUT).

Entry	DXM concentration* (mg/mL)		Encapsulation efficiency (%)		D_h (nm)		ζ-potential (mV)
	In olive oil core	In dispersion	UV-vis	HPLC	With CTMA-Cl	With LUT	With LUT
SiO_2 NCs	0	0	0	0	154 ± 79	158 ± 91	-3.2
SiO_2-DXM1 NCs	1	0.03	73.1	76.9	162 ± 73	182 ± 102	-1.3
SiO_2-DXM10 NCs	10	0.3	90.6	93.6	160 ± 79	175 ± 99	-2.1
SiO_2-DXM50 NCs	50	1.5	94.5	95.3	134 ± 65	151 ± 85	-1.9
SiO_2-DXM100 NCs	100	3	96.4	97.0	147 ± 67	159 ± 72	-2.2

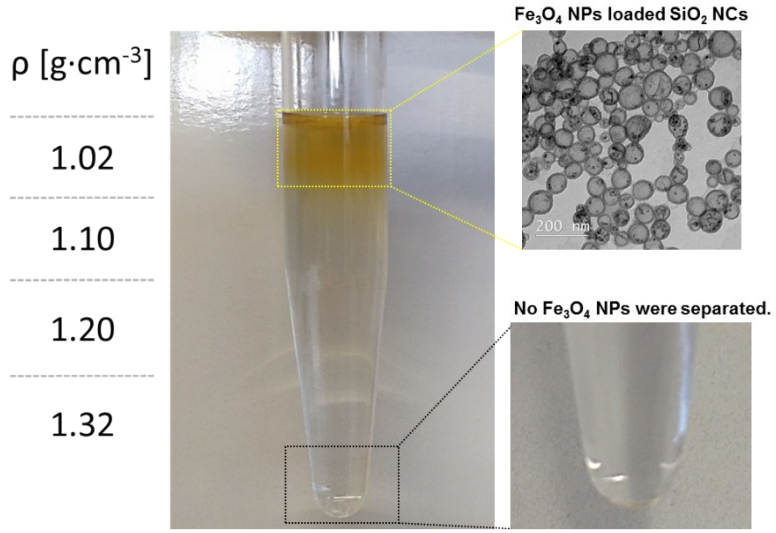
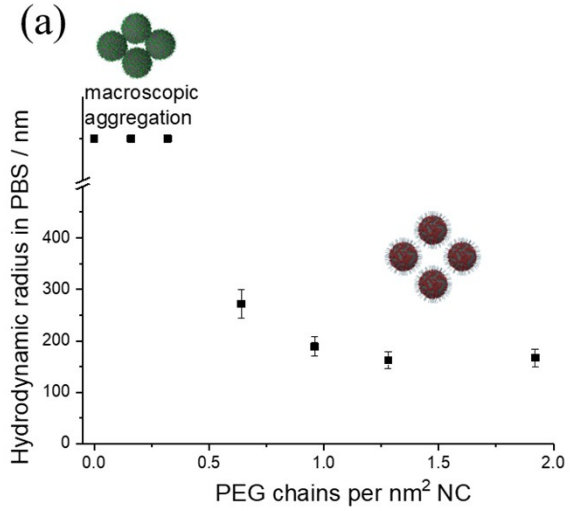


Figure S2. Gradient centrifugation for investigating the encapsulation efficiency of Fe_3O_4 NPs in SiO_2 NCs. Sucrose solutions with densities ranging between 1.00 and 1.30 g·cm^{-3} were prepared (left). The upper brown phase contains Fe_3O_4 NPs labeled SiO_2 NCs (TEM micrograph top right). No solids were collected after the centrifuge process (photograph bottom right), indicating there was no free Fe_3O_4 NPs outside the NCs.

(a)



(b)

PEG chains per nm² NC	I% protein	I% SiO_2 NCs	I% aggr.	R_h aggr. / nm
0 to 0.64	macroscopic aggregation in blood plasma			
0.96	39%	35%	26%	942
1.28	41%	14%	45%	445
1.92	37%	18%	45%	499

Figure S3. (a) Hydrodynamic radius of PEGylated SiO_2 NCs with various PEGylation density measured with DLS in PBS. (b) Hydrodynamic radius R_h of aggregates formed after incubating SiO_2 NCs in blood plasma with corresponding intensity contribution factors I% of plasma protein, SiO_2 NCs and aggregates (scattering angle 30°, T = 20 °C). Values were determined *via* DLS multicomponent analysis.

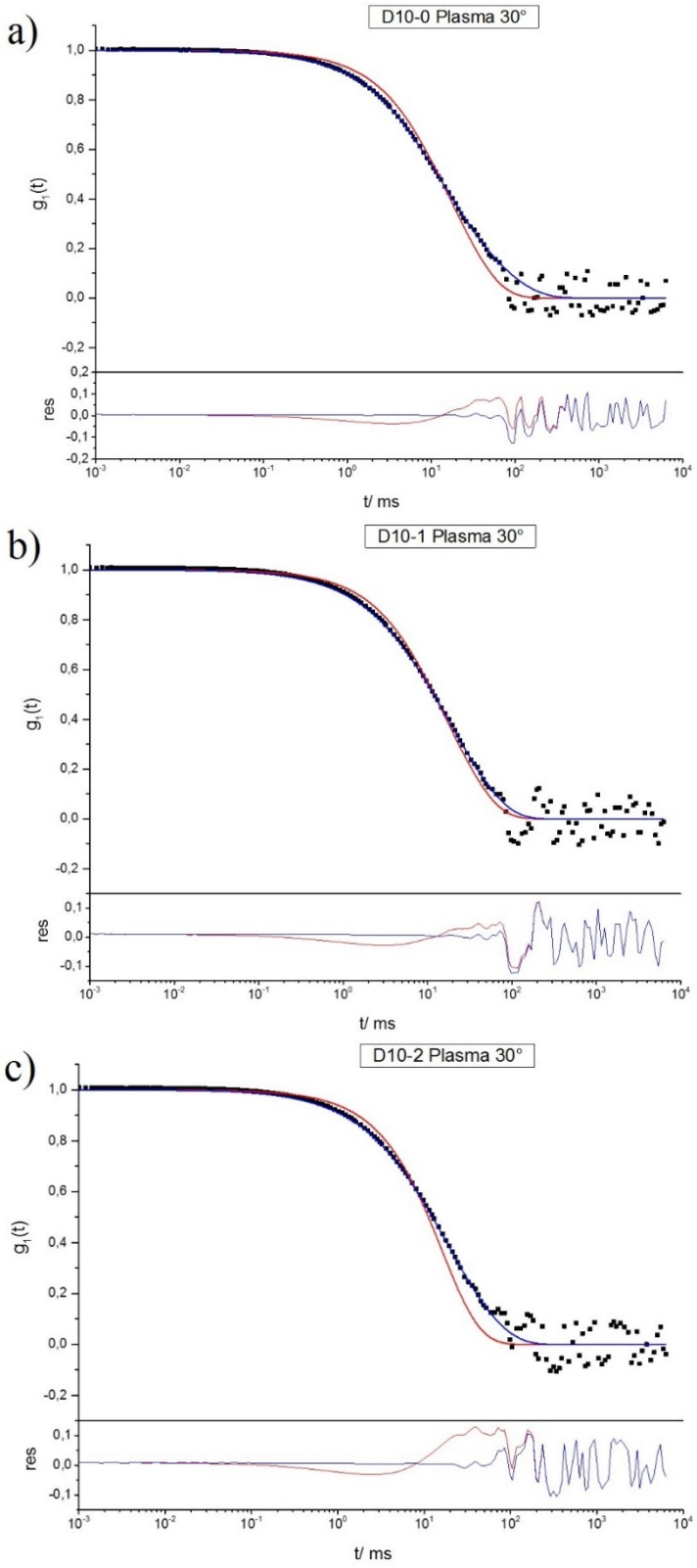


Figure S4. Upper graphs: exemplary autocorrelation functions $g_1(t)$ (black dots) of the mixture of plasma/PEGylated NCs with PEGylation density of (a) 0.96 per nm², (b) 1.28 per nm², and (c) 1.92 per nm² at a scattering angle of 30°. Temperature for the measurement was 20 °C. The red line represents the fit of the sum of the individual components whereas the blue line represents the fit with an additional aggregation function. Lower graphs: corresponding residuals resulting from the difference between the data and the two fits.

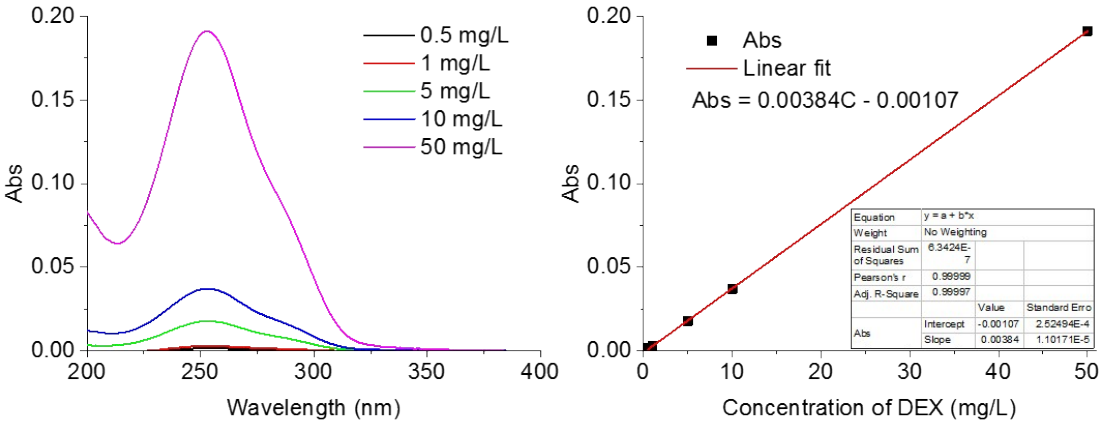


Figure S5. Calibration curve for determining the concentration of DXM in water at pH 7 by UV spectroscopy.