Supplementary material

Specific Buffer Effects on the Formation of BSA Protein Corona Around Amino-Functionalized Mesoporous Silica Nanoparticles

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Table S1. Physicochemical characterization of $MSN\text{-}NH_2$ through nitrogen physisorption and SAXS.

sample	S_{BET} ($m^2\ g^{-1}$)	d_{BJH} (nm)	Pore volume ($cm^3\ g^{-1}$)	Lattice parameter (nm)
$MSN\text{-}NH_2$	675	2.6	0.72	4.05

Table S2. Hydrodynamic size (d_H), polydispersity index (PdI) and zeta potential (ζ) of MSN samples in MilliQ water.

sample	d_H (nm)	PdI	ζ (mV)
$MSN\text{-}NH_2$	163 ± 16	0.255	+16.6 ± 0.3

Table S3. Buffer species used in the present work and their respective pK_a values.

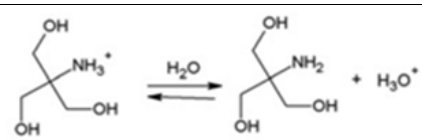
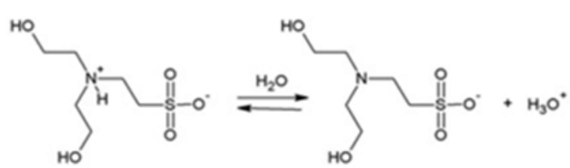
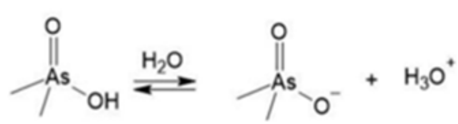
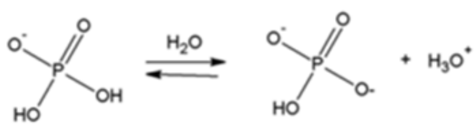
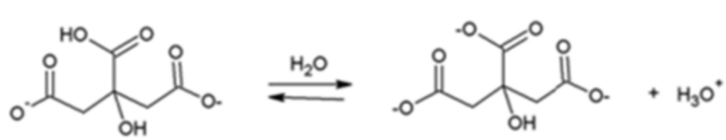
Buffer	**Acid/base equilibrium**	**pK_a**
Tris		8.06
BES		7.09
Cacodylate		6.30
Phosphate		7.22
Citrate		6.40

Table S4. Zeta potentials (ζ) of BSA in buffer solutions at pH 7.15 and different concentrations (10, 50, 100 mM).

	ζ / mV		
Buffer	**10 mM**	**50 mM**	**100 mM**
Tris	-13.4 ± 0.6	-3.7 ± 0.8	-5 ± 1
BES	-15.2 ± 0.9	-5.4 ± 0.6	-5.4 ± 0.3
Cacodylate	-20 ± 2	-8.7 ± 0.4	-6 ± 1
Phosphate	-22 ± 1	-13 ± 1	-6.2 ± 0.5
Citrate	-19 ± 1	-11.3 ± 0.8	-8.2 ± 0.1

Table S5. Zeta potentials (ζ) of MSN-NH_2 in buffer solutions at pH 7.15 and different concentrations (10, 50, 100 mM).

	ζ / mV		
Buffer	**10 mM**	**50 mM**	**100 mM**
Tris	17 ± 1	10 ± 1	9 ± 1
BES	9 ± 0.6	-5.0 ± 0.1	-4.6 ± 0.2
Cacodylate	9 ± 1	-4.3 ± 0.6	-5.5 ± 0.2
Phosphate	-1.7 ± 0.4	-7.1 ± 0.2	-9.9 ± 0.8
Citrate	-14 ± 0.7	-14 ± 2	-8.6 ± 0.7

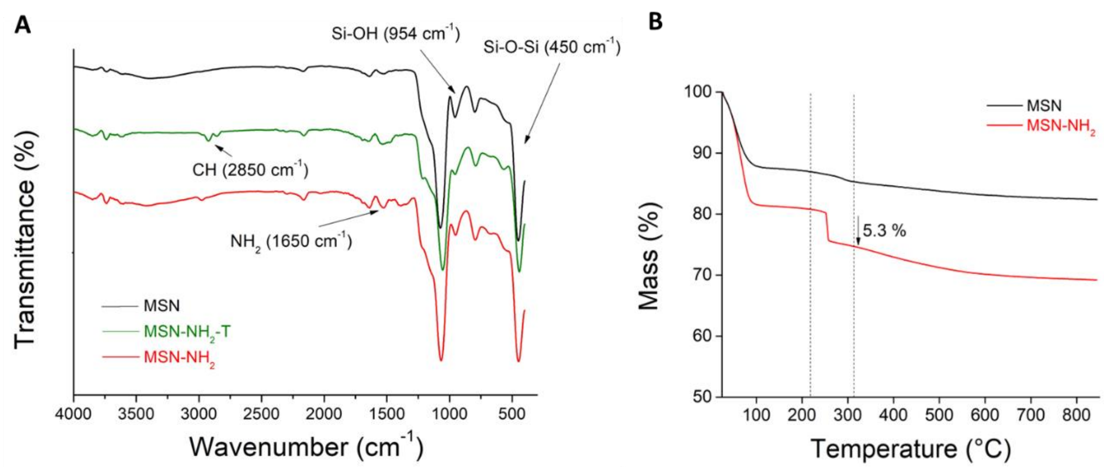


Figure S1. FTIR spectra (A) and TGA analysis (B) of MSN and MSN-NH_2 samples

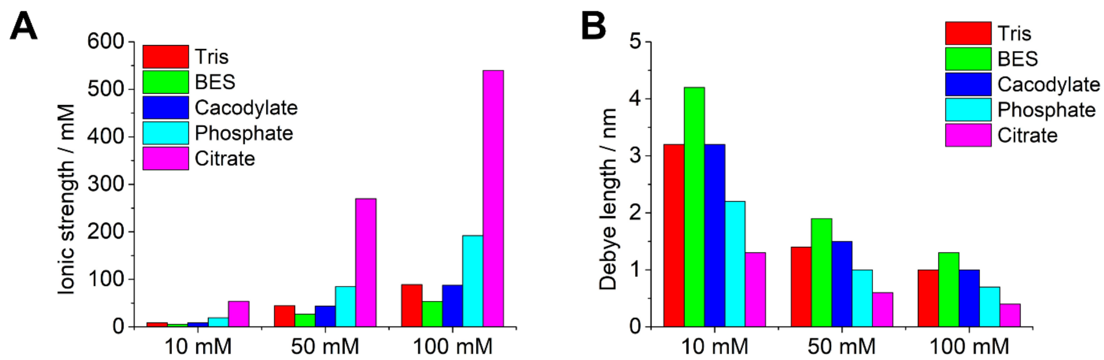


Figure S2. Ionic strength (A) and Debye length (B) for each buffer solution.

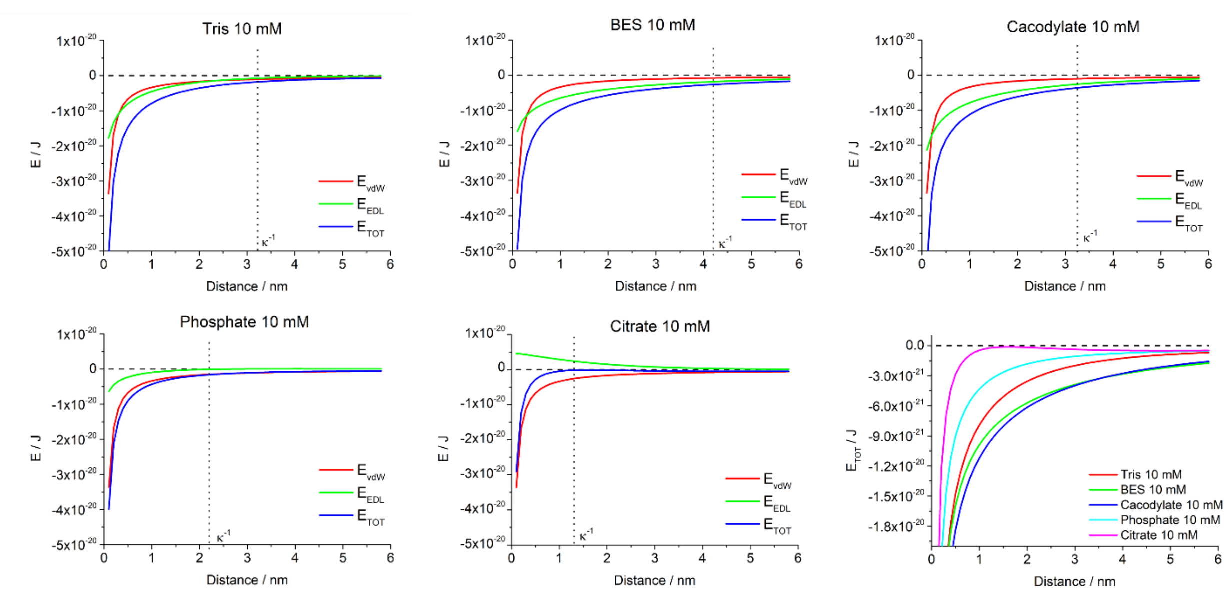


Figure S3. Interaction energies between BSA and MSN-NH_2 *vs* distance for 10 mM buffer concentration. van der Waals energy (E_{vdW}), electric double layer energy (E_{EDL}) and total energy (E_{TOT}).

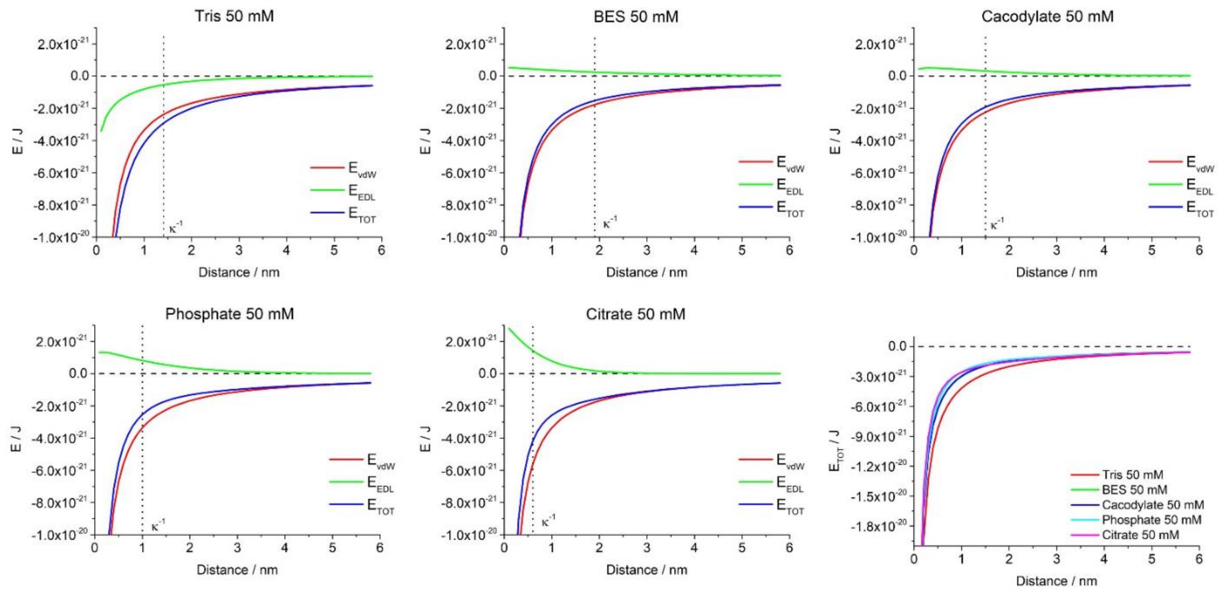


Figure S4. Interaction energies between BSA and MSN-NH_2 *vs* distance for 50 mM buffer concentration. van der Waals energy (E_{vdW}), electric double layer energy (E_{EDL}) and total energy (E_{TOT}).

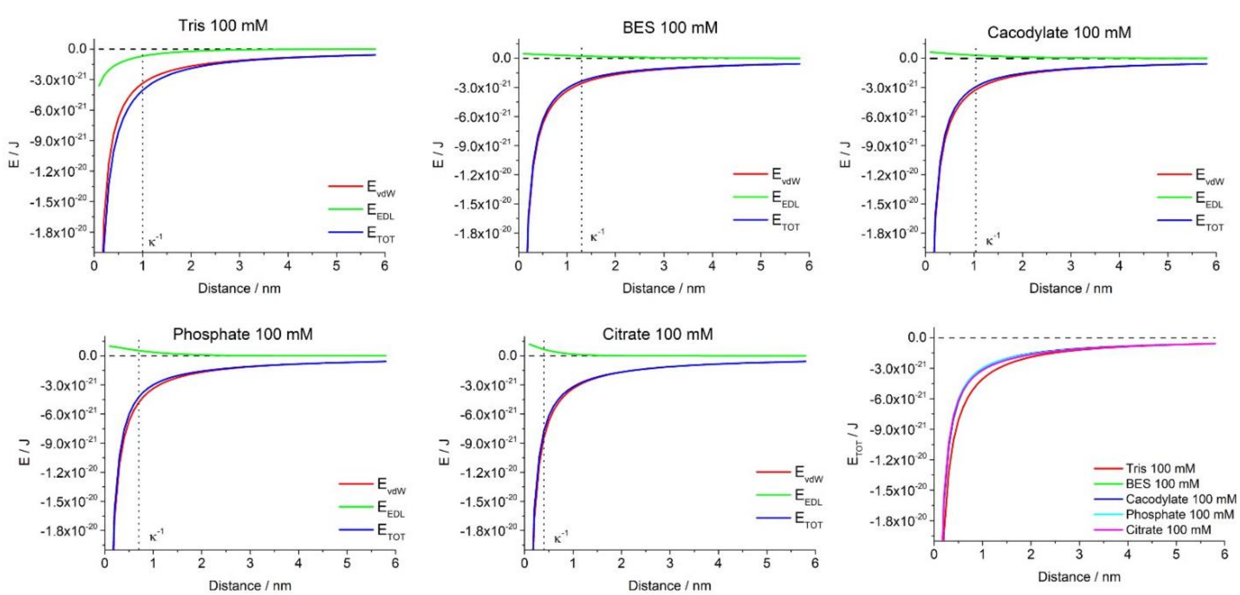


Figure S5. Interaction energies between BSA and MSN-NH_2 *vs* distance for 100 mM buffer concentration. van der Waals energy (E_{vdW}), electric double layer energy (E_{EDL}) and total energy (E_{TOT}).

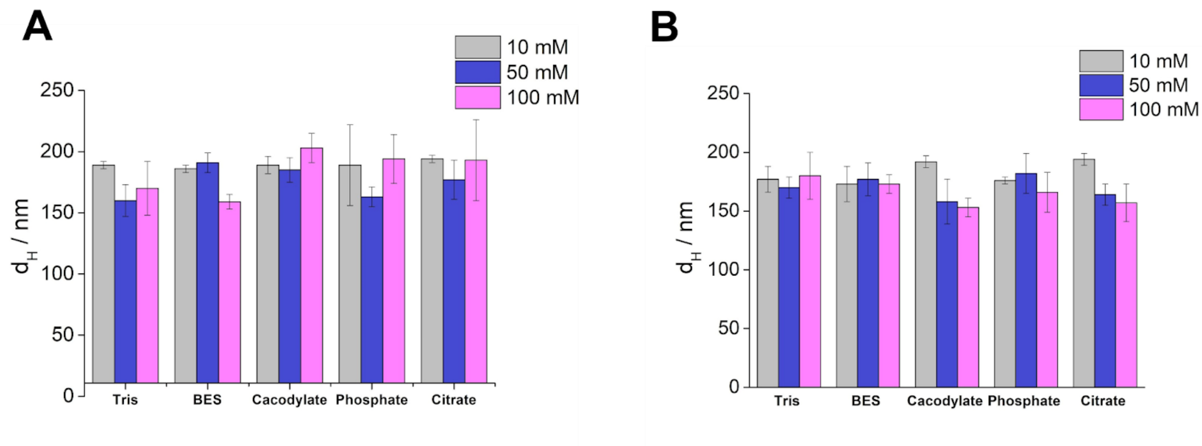


Figure S6. Hydrodynamic size of the BSA corona adsorbed onto the MSN-NH_2, following the 24-hours long incubation step in (A) buffers and (B) MilliQ water with pH adjusted to 7.15.