Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Highly efficient and safe gene delivery platform based on polyelectrolyte core-shell nanoparticle for hard-to-transfect clinically relevant cell types

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Supporting figures

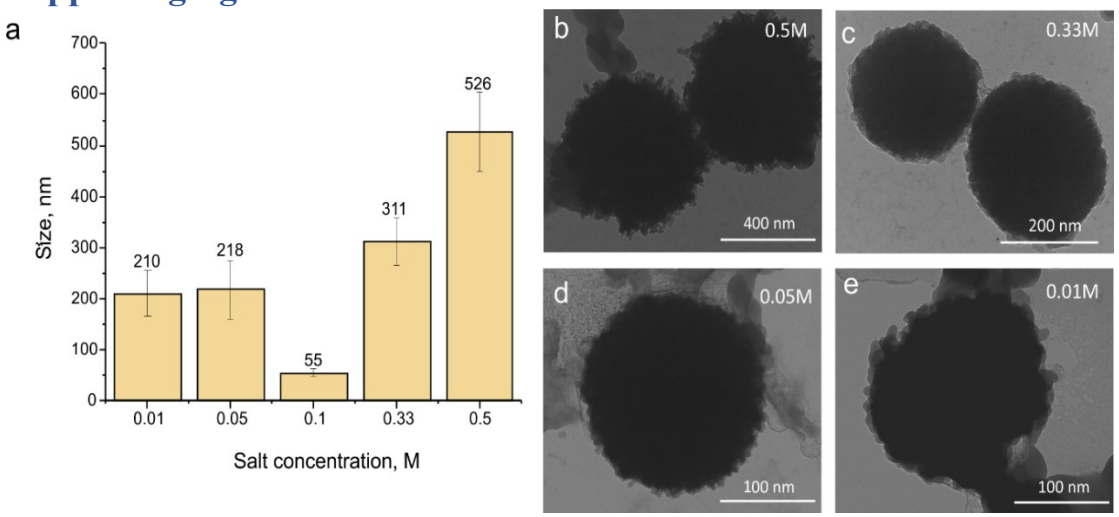


Figure S1. a) dependence of the calcium carbonate particles size depends on salts concentration in reaction mixture (example 0.01 means that tot the reaction mixture the same volume of 0.01 M $CaCl_2$ and 0.01 M Na_2CO_3 were added). (b-e) transmission electron microscopy images of the particles obtained form various salt concentration

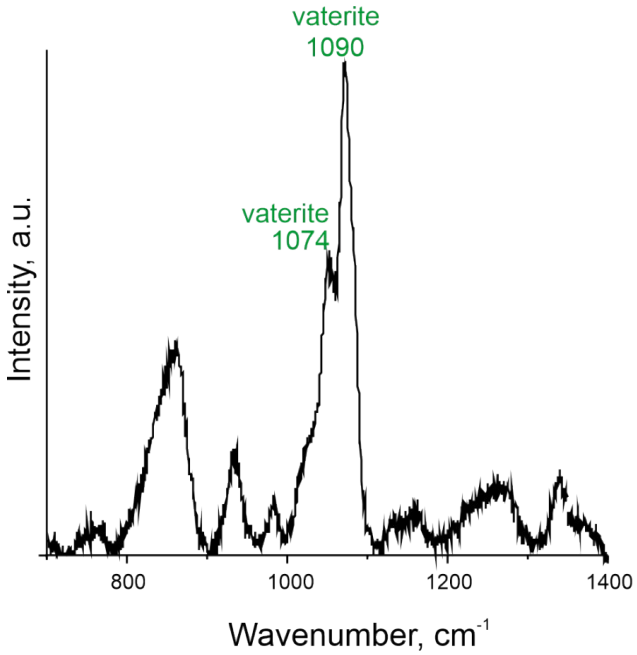
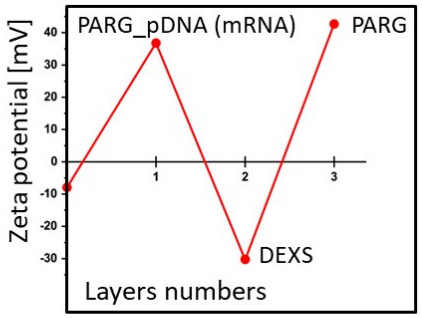
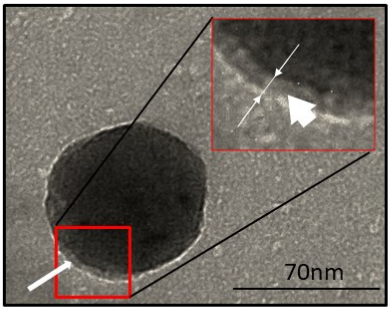


Figure S2. Raman spectroscopy demonstrate the vaterite peaks in 1074 and 1090 cm-

(a)



(b)



(c)

Layers	Supernatant concentration	
	mRNA (Initial concentration - 500 ng/µl)	**pDNA (Initial concentration – 250 ng/µl)**
(1) PARG_pDNA (mRNA)	7.2 ng/µl	10 ng/µl
(2) DEXS	0.1 ng/µl	0.1 ng/µl
(3) PARG	0.1 ng/µl	0.1 ng/µl
Total concentration loaded to the nanocapsules	492.6 ng/µl **(98,52%)**	239.8 ng/µl **(95,92%)**

Figure S3. (a) Changes in zeta potential with different numbers of layers during layer-by-layer coating. 0 layer – BSA_FITC, 1st layer – PARG_pDNA(or mRNA) complex, 2nd – DEXS, 3rd – PARG**.** (b) TEM images of core-shell nanoparticles. (c) Estimation of mRNA and plasmid DNA concentration in supernatants after loading into the nanocarriers polyelectrolyte layers based on porous nanovaterite by NanoDrop measurements.

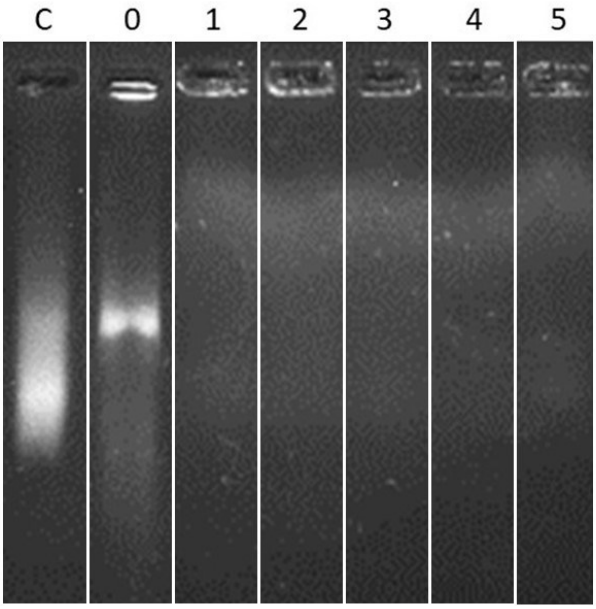


Figure S4. In vitro stability of core-shell nanoparticles with loaded genetic material.

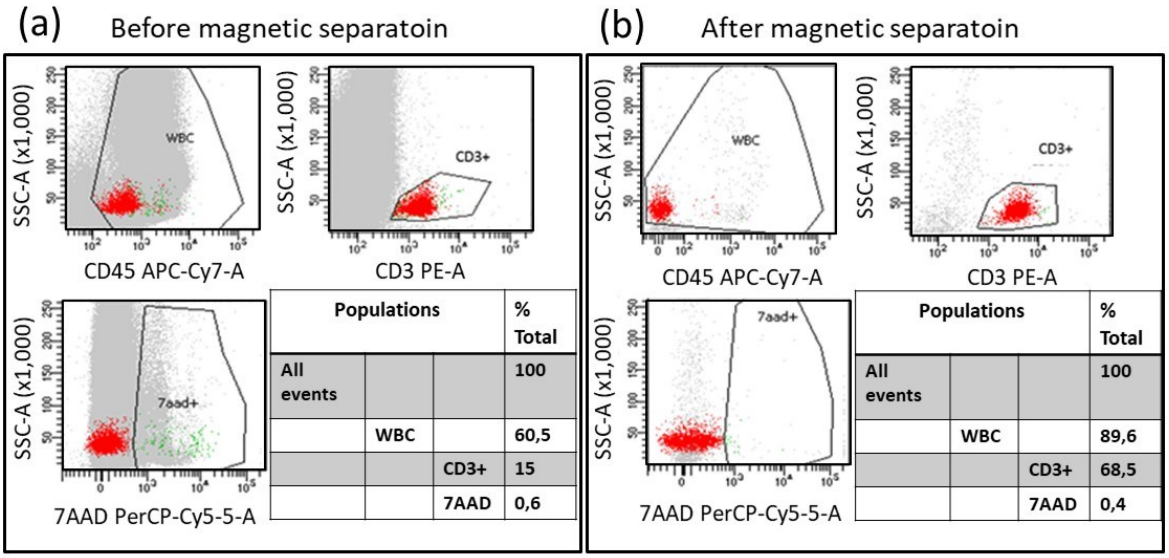


Figure S5. T-cells magnetic separation results. (a) Estimation of T-cells population before magnetic separation. (b) Magnetic separation was used to obtain a pure population of human lymphocytes from peripheral blood apheresis product.