Electronic Supplementary Material (ESI) for RSC Advances.

Design of Triphasic Poly(lactic-co-glycolic acid) Nanoparticles Containing a Perfluorocarbon Phase for Biomedical Applications

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Supporting Information

Effect of different parameters of synthesis

Impact of surfactant

Table S1. Types of surfactant used during the synthesis of nanoparticles and the characteristics of obtained particles.

Surfactant type	R_h[2] (nm) ±SD[3]	PDI[4]	PFCE content (wt-%)
Polyvinyl alcohol PVA (low MW[1])	120 ±10	0.11	16-26
PVA (high MW)	160 ±43	0.22	n/a
Tween 20	215 ±86	0.81	n/a
Sodium cholate	390 ±75	0.85	6
Polyvinylpyrrolidone (PVP)	450 ±268	0.77	3
Pluronic F68	315 ±92	0.45	n/a

[1]MW=molecular weight, [2]R_h=hydrodynamic radius, [3]SD=standard deviation, [4]PDI=polydispersity index

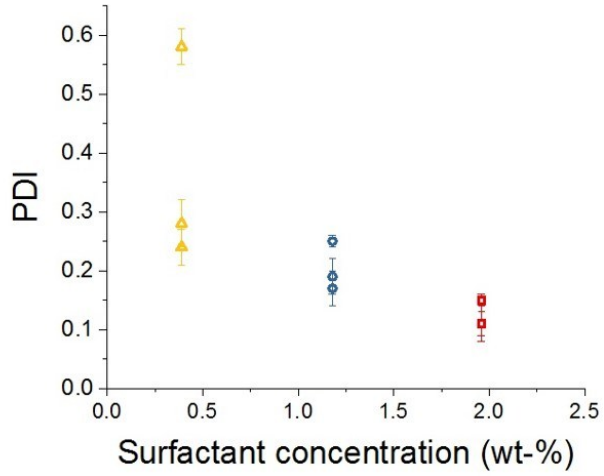

Fig. S1. Influence of PVA concentration on particle PDI. Particles were prepared using following surfactant concentrations: 2 wt.-%, 1.2 wt.-% and 0.4 wt.-%. Higher surfactant concentration resulted in nanoparticles with lower PDI. Error bars are based on standard deviation.

Variation of solvent

Table S 2. Types of solvents used during the synthesis of nanoparticles and the characteristics of obtained particles.

Solvent	Water miscibility	R (nm) ±SD[1] (based on TEM)	R_h[2] (nm) ±SD (based on DLS)	PDI[3]	PFCE content (wt-%)
Dichloromethane	Immiscible	85 ±37	120 ±10	0.11	16-26
Ethyl Acetate	Immiscible	75 ±25	135 ±15	0.12	27-53
Chloroform	Immiscible	76 ±36	145 ±15	0.13	24-29
Acetone	Miscible	155 ±170	300 ±101	0.44	7-9

Tetrahydrofuran Acetonitrile	Miscible Miscible	125 ±103 85 ±32	195 ±55 235 ±45	0.33 0.35	4-7 2-4

[1]SD=standard deviation, [2]R_h=hydrodynamic radius, [3]PDI=polydispersity index

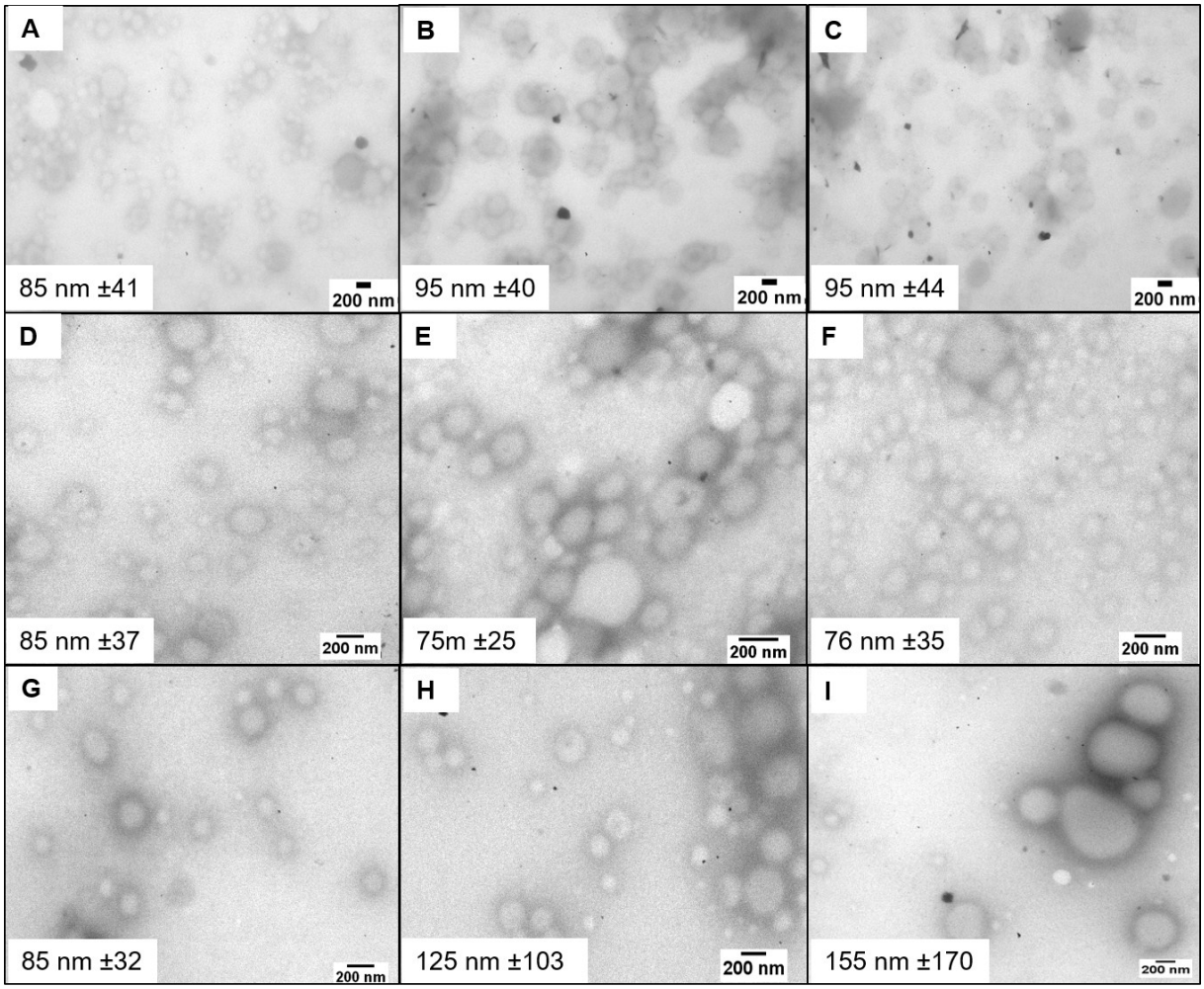

Fig. S2. TEM images of particles formulated with different PLGA concentration: (A) 1.75 wt.-%, (B) 2.6 wt.-%, (C) 3.45 wt.-%; and various solvents: (D) PLGA-DCM, (E) PLGA-AcOEt, (F) PLGA-Chloroform, (G) PLGA-Acetone, (H) PLGA-THF, (I) PLGA-MeCN particles. Indicated size and standard deviation were calculated after measurement of an average of 100 particles

Table S3. Characteristics of nanoparticles prepared with combination of different polarity solvent.

Nanoparticles (solvent type)	R_h ±SD (based on DLS at 173°)	Polydispersity Index	PFCE encapsulation (wt.-%)
DCM	93-103 ±5	0.05-0.12	20-22
DCM+MeCN	85-99 ±2	0.06-0.15	17-19
DCM+toluene	117-196 ±32	0.16-0.28	11-19

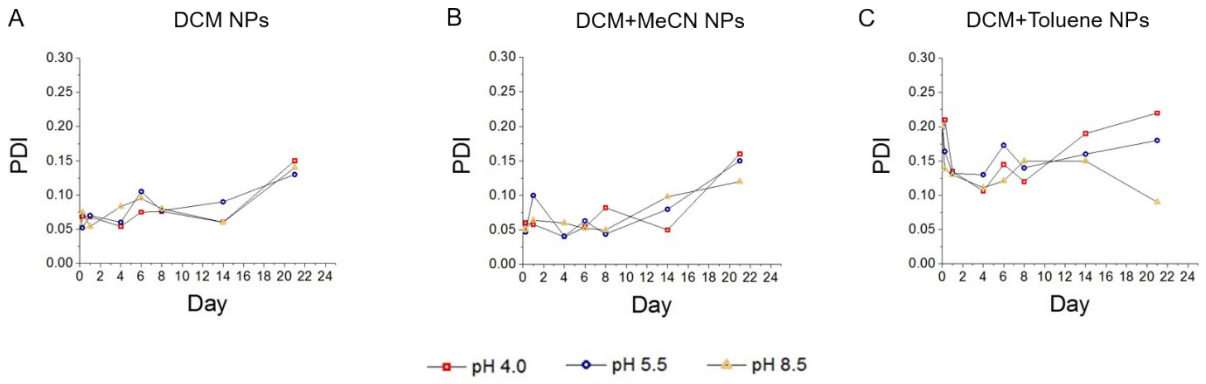

Fig. S3. DLS analysis of incubated samples, showed gradual increase in particles PDI (A-C). Lines indicate trend of the data.

Dye encapsulation

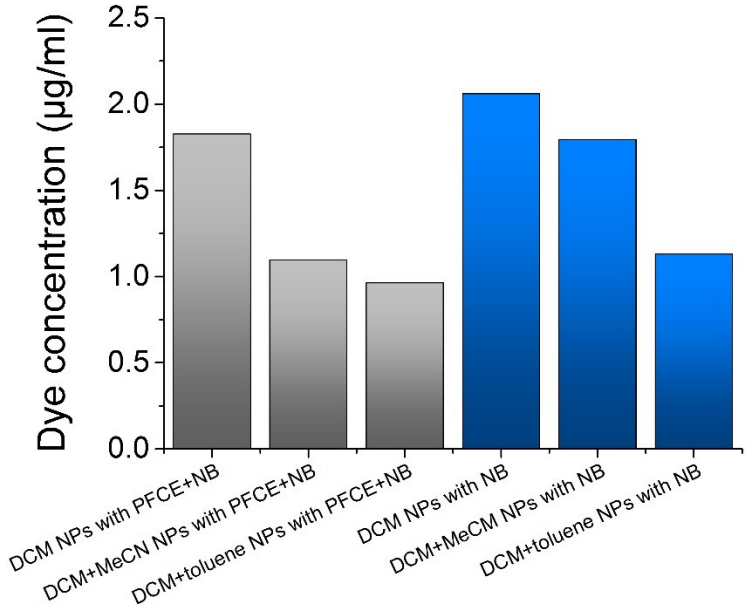

Fig. S4. Comparison of nile blue encapsulation in PLGA nanoparticles with or without PFCE. Nanoparticles synthesized with combination of different solvents (LIST HERE; WHICH). The particles were synthesized either with or without PFCE.

Cellular Uptake

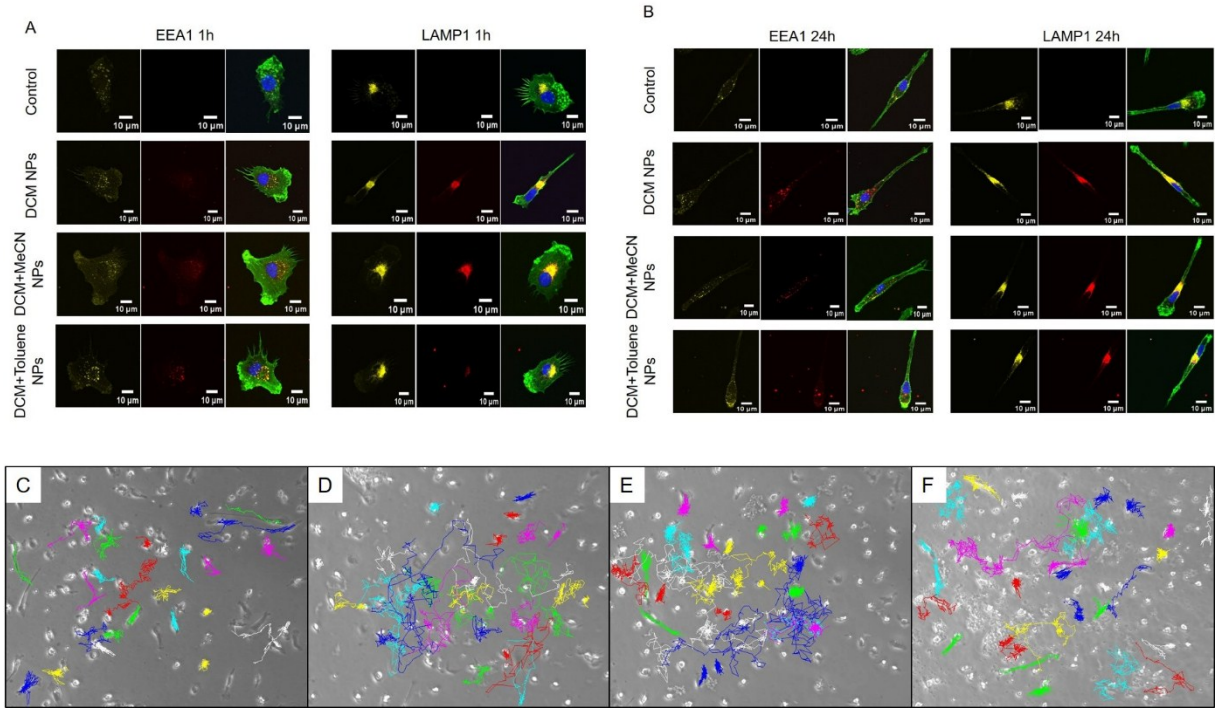

Fig. S5. (A-B) Images of confocal microscopy showing the uptake of particles by human monocyte-derived DCs after 1 hour (A) and 24 hours (B) of incubation. Fluorescent signal coming from the particles partially overlaps with the EEA1 signal. Higher colocalization of particles was observed with the LAMP1 signal. (C-F) Images show the trajectory of migrating cells which were either non-labeled (C) or labeled with DCM particles (D), DCM+MeCN particles (E) or DCM+Toluene particles (F). Cell migration was measured over the course of 24 hours.