

Supplementary Information

Evidence of nose-to-brain delivery of nanoemulsions: cargoes but not vehicles

Ejaj Ahmad^a, Yunhai Feng^b, Jianping Qi^a, Wufa Fan^a, Yuhua Ma^a, Haisheng He^a, Fei Xia^a, Xiaochun Dong^a, Weili Zhao^{a,c}, Yi Lu^{a,†}, Wei Wu^{a,†}

^aSchool of Pharmacy, Fudan University, Key Laboratory of Smart Drug Delivery of MOE and PLA, Shanghai 201203, China

^bDepartment of Otorhinolaryngology Head & Neck Surgery, Dahua Hospital, Shanghai 200237, China

^cKey Laboratory for Special Functional Materials of the Ministry of Education, Henan University, Kaifeng 475001, China

† Corresponding author. E-mail: wuwei@shmu.edu.cn; fd_luyi@fudan.edu.cn

Table 1S The amount of dye in nanoemulsion formulations

Dye	CS-NE-108	NE-80	NE-200	NE-500	NE-900	CS-NE-108	NE-80	NE-900
P2 (μg)	800	600	350	400	400			
DiR (μg)	300							
P4 (μg)						80	80	70
C6 (μg)						100	100	100

Table 2S Characterization of nanoemulsions encapsulating different fluorescent dyes

Formulation	Size (nm)	PDI	ζ (mV)	FL intensity (a.u) × 10 ⁹			
				P2	DiR	P4	C6
CS-NE-80	108.5±0.36	0.17	+26.16±0.32	4.48±0.37			
CS+NE-80	128.7±1.62	0.25	+0.021	4.53±0.07			
CS-NE-80	105.8±0.10	0.24			6.25±0.25		
P-NE	236.5±3.67	0.16	−1.17±0.33	1.82±0.09			
NE-80	83.3±1.10	0.11		3.87±0.12			
NE-200	213.1±5.60	0.18		4.07±0.33			
NE-500	515.4±6.10	0.17		4.02±0.11			
NE-900	930.0±15.50	0.18		4.29±0.07			
CS-NE-108	107.7±1.28	0.26	+23.30±0.26			1.45±0.05	1.57±0.02
NE-80	73.1±0.90	0.08				1.62±0.06	1.89±0.02
NE-900	924.6±6.40	0.19				1.82±0.06	2.66±0.04

Table 3S Effect of chitosan coating on the physicochemical properties of nanoemulsions

Chitosan (%, w/v)	SDS (mg)	Dye	Size (nm)	PDI	ζ (mV)
0	125		94.3 $\pm$ 1.25	0.27	-59.2 $\pm$ 0.47
0.5	0		131.3 $\pm$ 1.60	0.23	-0.046 $\pm$ 0.01
0.5	250		85.9 $\pm$ 0.41	0.14	+3.12 $\pm$ 0.50
0.5	150		95.3 $\pm$ 0.93	0.23	+21.4 $\pm$ 0.47
0.5	125		92.9 $\pm$ 0.93	0.22	+32.8 $\pm$ 1.42
0.5	125	P2	108.5 $\pm$ 0.36	0.17	+26.2 $\pm$ 0.32
0.5	75		115.4 $\pm$ 0.86	0.25	30.1 $\pm$ 0.51

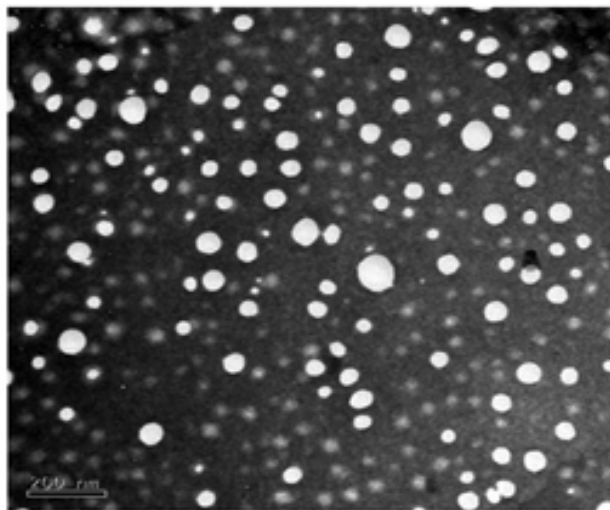


Fig. 1S TEM image of chitosan coated nanoemulsion