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

Electronic Supporting information

Devising New Lipid-coated Calcium Phosphate/Carbonate Hybrid Nanoparticles to Control Release in Endosome for Efficient Gene Delivery

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Table S1 Information of oligonucleotides

Name	Supplier	Sequence
dsDNA-cy5 (sense)	IDTDNA	TTCTCCGAACGTGTCACGTTT-cyanine 5
dsDNA-cy5 (antisense)	IDTDNA	AAACGTGACACGTTCGGAGAA
PD-L1 (sense)	Sigma	AGACGUAAGCAGUGUUGAA
PD-L1 (antisense)	Sigma	UUCAACACUGCUUACGUCU
Negative control (sense)	Sigma	CUUACGCUGAGUACUUCGA
Negative control (antisense)	Sigma	UCGAAGUACUCAGCGUAAG
PD-L1 primer (Forward)	Sigma	CCCTCTGATCGTCGATTGGC
PD-L1 primer (Forward)	Sigma	GCTTAGCAGTGTCTCCCTGG
Plk1 (sense)	IDTDNA	CCAUUAACGAGCUGCUUAA
Plk1 (antisense)	IDTDNA	CCAUUAACGAGCUGCUUAA
Scramble-Plk1 (sense)	IDTDNA	UUCUCCGAACGUGUCACGU
Scramble-Plk1 (antisense)	IDTDNA	ACGUGACACGUUCGGAGAA

Table S2. The component element analysis of LCCP cores with different P/C ratios.

Molar ratio (P:C)	Ca (mmol/g)	P (mmol/g)	C (mmol/g)	C/P molar ratios (calculated/theoretical)	Possible formula*
4:0	9.38	6.84	0.69	0.26/0.00	$Ca[(HPO_4)_{0.8}(CO_3)_{0.1}(OH)_{0.2}]$
3:1	9.55	5.80	1.73	0.46/0.33	$Ca[(HPO_4)_{0.7}(CO_3)_{0.2}(OH)_{0.2}]$
2:2	9.46	3.72	4.16	1.26/1.00	$Ca[(HPO_4)_{0.4}(CO_3)_{0.5}(OH)_{0.2}]$
1:3	9.44	2.09	7.15	3.44/3.00	$Ca[(HPO_4)_{0.2}(CO_3)_{0.7}(OH)_{0.2}]$

* Assuming the existence patterns of phosphorous and carbo are HPO_4^{2-} and CO_3^{2-}, respectively.

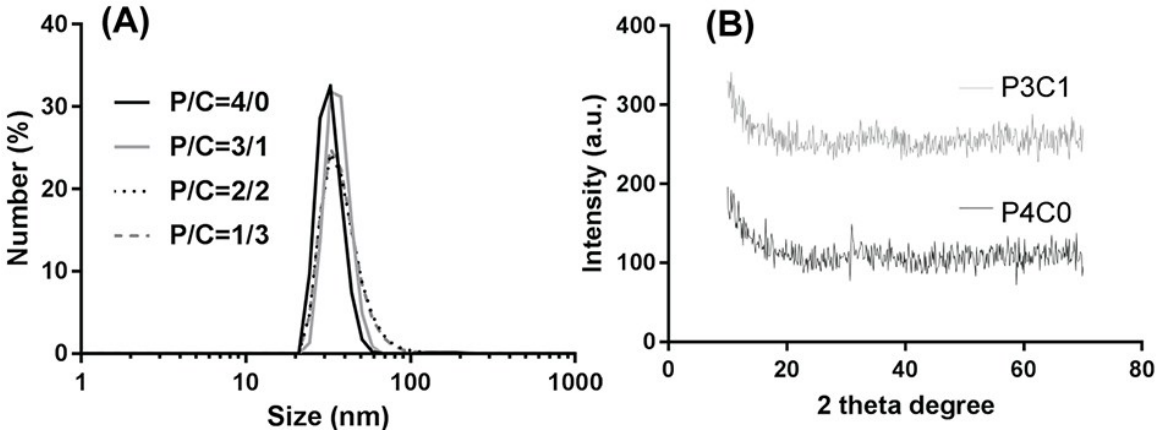

Figure S1. (A) The hydrodynamic diameter of LCCP NPs, represented by Number (%); and (B) XRD pattern of P4C0 and P3C1 cores.

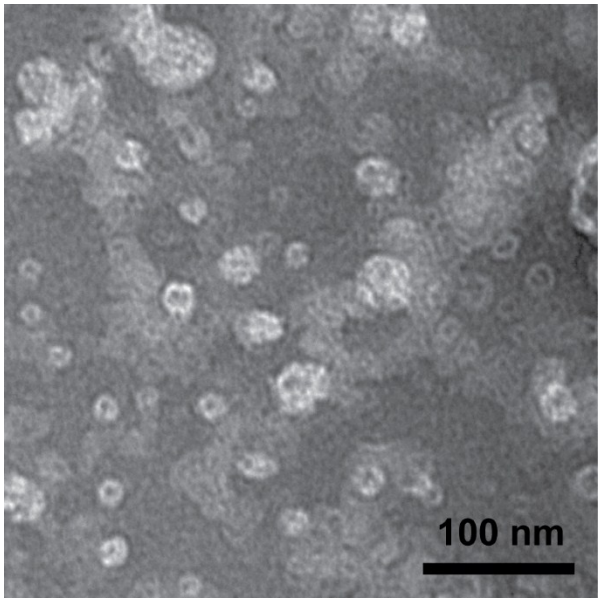

Figure S2. TEM image of P3C1 NPs negative staining with 1% uranyl acetate.

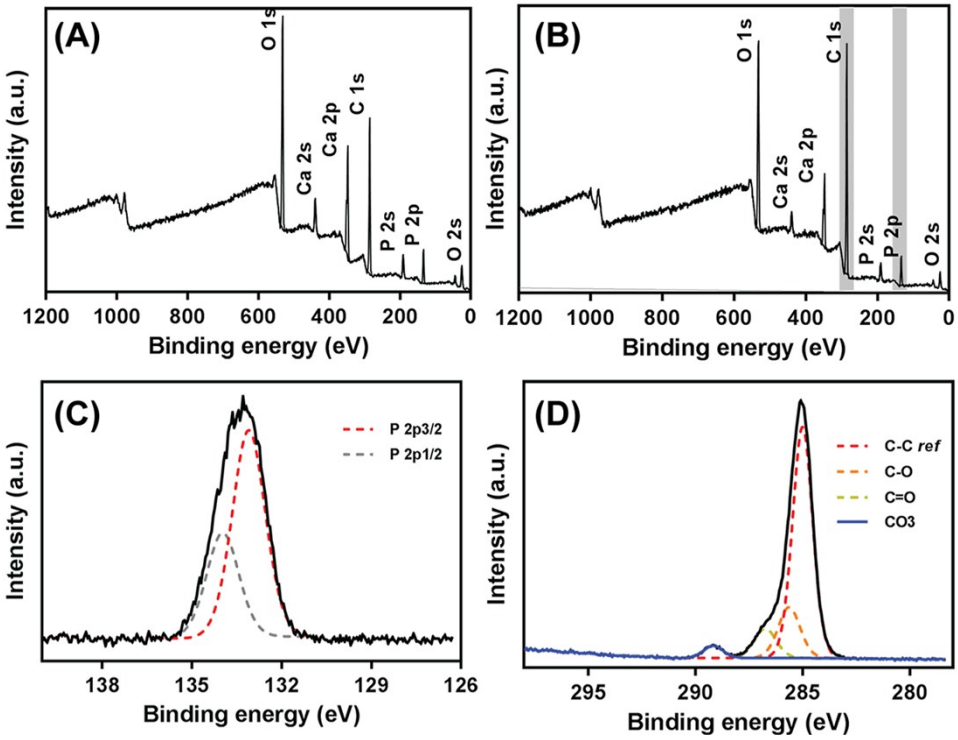

Figure S3. XPS survey scan of **(A)** P4C0 and **(B)** P3C1 cores coated with DOPA. The details of P3C1 were shown in high resolution scan of **(C)** P2p and **(D)** C1s.

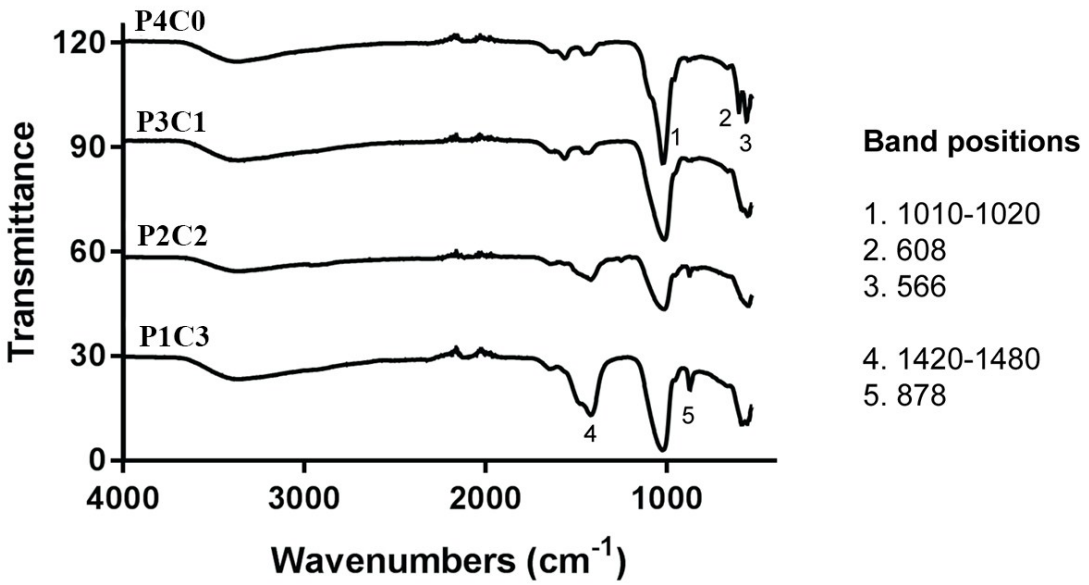

Figure S4. FTIR spectrum for the LCCP cores.

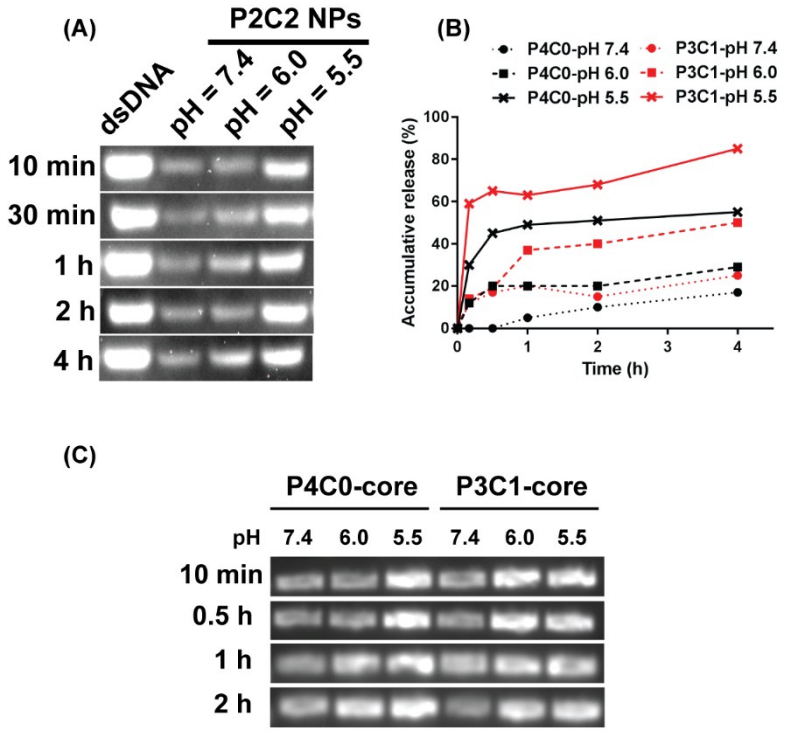

Figure S5. (A) P2C2 release profile; (B) DNA band intensity in Figure 4 normalized by the first lane dsDNA in corresponding line; (C) The release trend of P4C0 and P3C1 cores under different pH values.

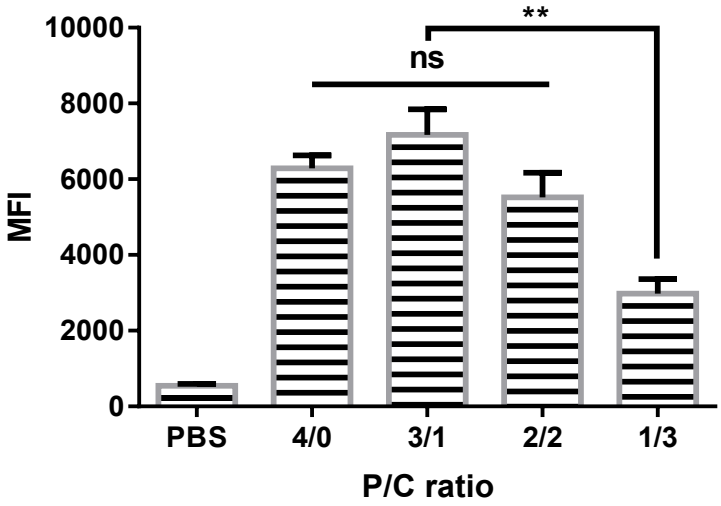

Figure S6. The effect of P/C ratios on the taken up of particles with 25 nM dsDNA-cy5, represented by MFI.

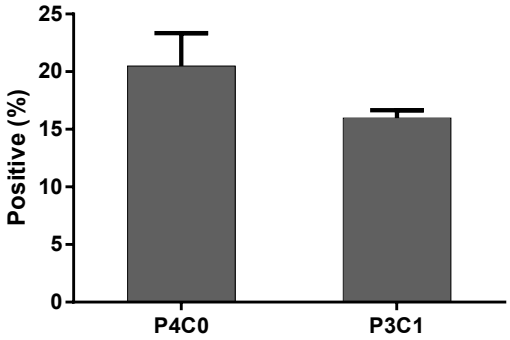

Figure S7. The positive cell percentage of B10F10 treated with P4C0 or P3C1 with dsDNA-cy5 at 25 nM cy5 concentration. Cells were cultured in DMEM containing 10% FBS for 4 h with P4C0 or P3C1 NPs.

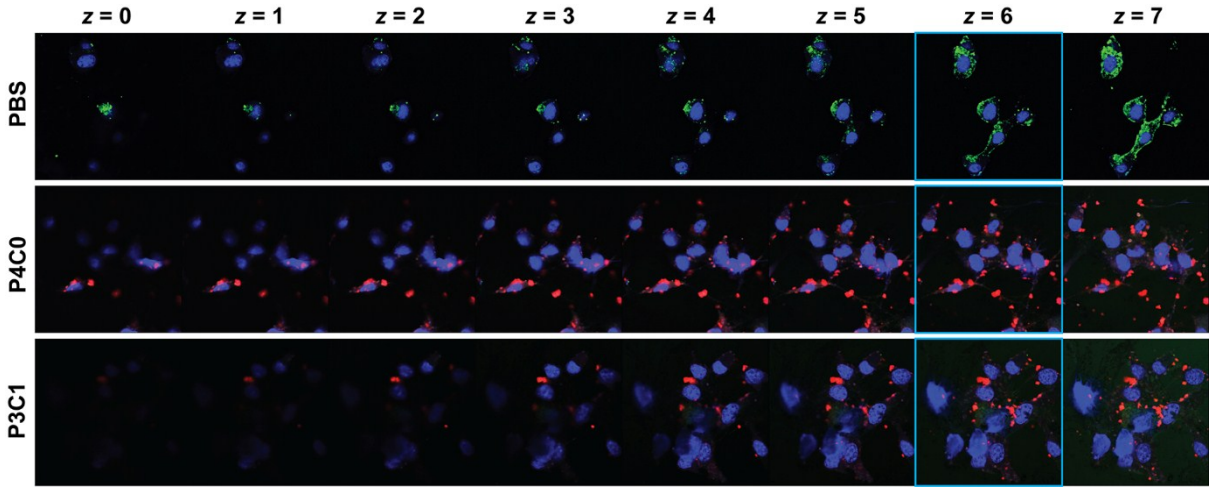

Figure S8. CLSM images of the same region of cells at different z stacks. The z = 6 and 7 planes were focused on the central of most cells in the selected area. The individual channels and three-view diagrams based on the images at z = 6 position of each series (blue framed) was chosen as examples and shown in Figure 7.

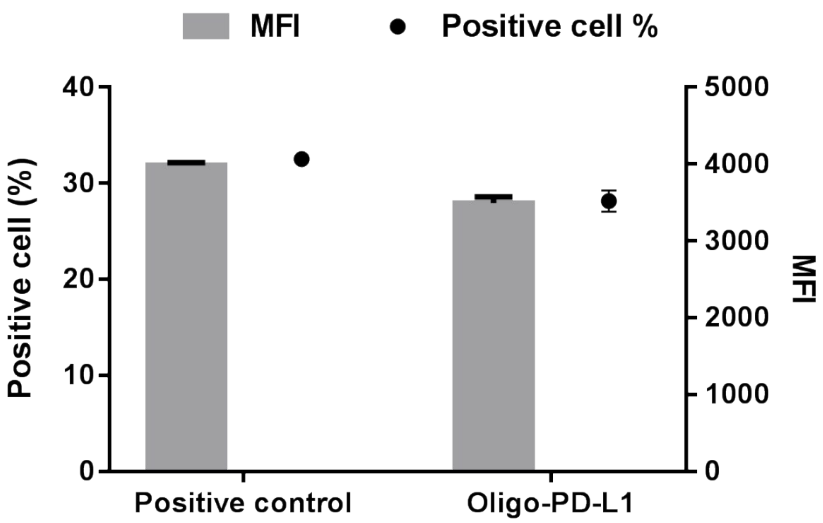

Figure S9. The down regulation of PD-L1 expression for B16F10 cells treated with Oligo-PDL1 (40 nM)