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

Supporting Information on:

Poly-L-lysine assisted synthesis of core-shell nanoparticles and conjugation with triphenylphosphonium to target mitochondria

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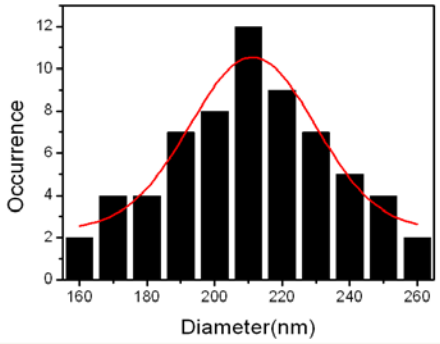
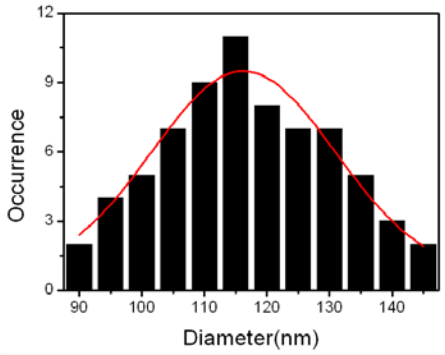
Size distribution of PLL-NPs

(A)



(B)



(C)

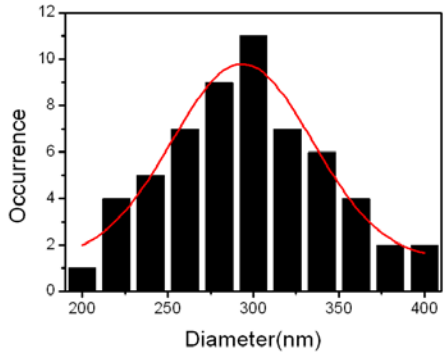


Fig. S1. Histogram of diameter data of M-PLL-NPs, MH-PLL-NPs and H-PLL-NPs obtained from the SEM images in Fig. 1B, C and D respectively.

Molecular weight of PLL influences the size of as-prepared NPs. According to their respective SEM image (in Fig. 1), the average diameter is calculated to be 170, 120 and 280 nm, respectively, for M-PLL-NPs, MH-PLL-NPs and H-PLL-NPs (Fig. S1).

Influence of acetone concentration on fluorescamine assay of MH-PLL-NPs

To 1 mL of MH-PLL-NPs aqueous dispersion, 50 μL (1 mg/mL in acetone), 150 μL (0.33 mg/mL), 500 μL (0.1 mg/mL), 750 μL (0.067 mg/mL) and 1000 μL of fluorescamine (0.05 mg/mL) was added respectively. The total volume of above mixtures was kept at 2 mL by addition of water, so that concentrations of MH-PLL-NPs and fluoresacmine were constant in all samples except for acetone. The emission spectra were then recorded under an excitation of 392 nm, and the fluorescence intensity at 482 nm was plotted against the concentration of acetone in Fig. S2. Clearly, the fluorescent intensity increased with the rise of acetone concentration, which could be attributed to the swelling effect of acetone.

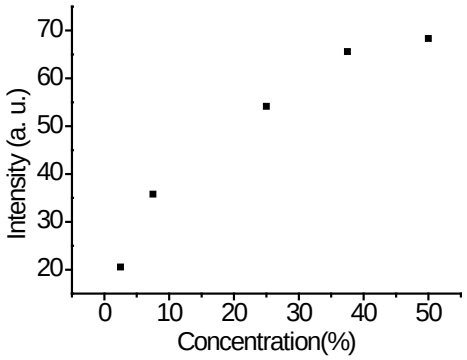


Fig. S2. Fluorescence intensity of aminolysis products with MH-PLL-NPs versus concentration of acetone.

Calibration curve of amino groups in MH-PLL by fluorescamine assay

Procedures of fluoresamine assay were described in the main text. The emission spectra of aminolysis product react with different amount of MH-PLL were shown in Figure S.3A. The fluorescent intensity at 482 nm, $I_{Int.}$, was plotted against concentration of amino groups in PLL, C_{AG}, and a linear calibration line was derived

as follows:

$$I_{Int.} = 10.8 + 3.7*C_{AG} \quad \text{Eq. S1}$$

Taking advantage of the linear function Eq. S1, surface amino groups in MH-PLL-NPs could be determined.

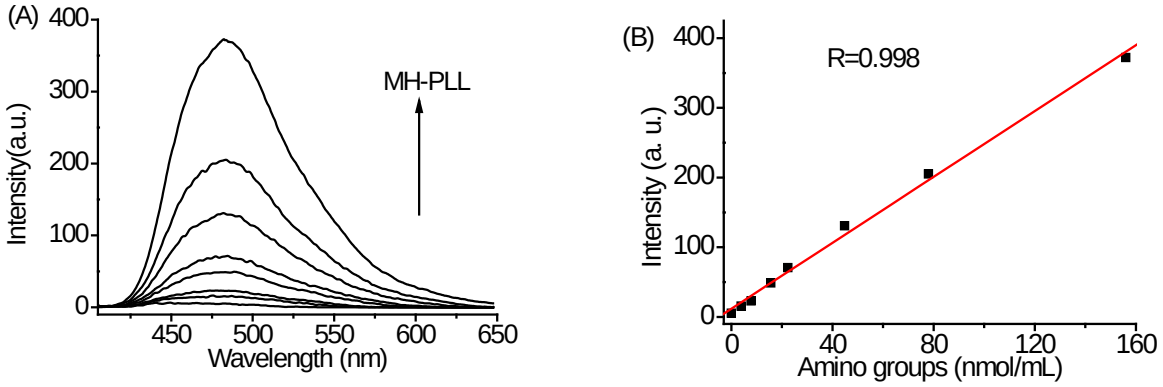


Fig. S3. (A) Emission spectra of fluorescamine reacted with varying amounts of MH-PLL (λ_{ex} = 392 nm). From bottom to top, concentration of MH-PLL increases from 0 (blank) to 0.5, 1, 2, 3, 6, 10 and 20 μg/mL in sequence. (B) The linear calibration plot of fluorescence intensities (λ_{em} = 482 nm) versus concentration of amino group in MH-PLL. The respective concentration in unit of amino group was 0, 7.8, 15.6, 22.4, 44.8, 78 and 156 nmol/mL.

SEM and zeta potential of TPP-MH-PLL-NPs

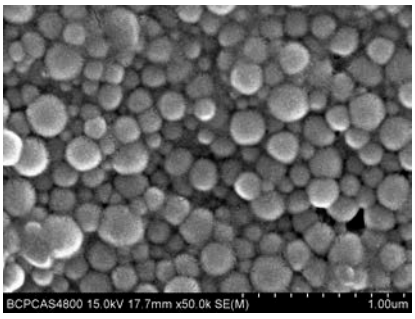


Fig. S4. SEM image of TPP-MH-PLL-NPs. The diameter of TPP-conjugated NPs was around 130 nm.

TPP-conjugated NPs were characterized by SEM (Figure S. 4). In comparing with the

size (120 nm) of MH-PLL-NPs, the influence of TPP-coupling could be neglected.

Fluorescent C6-doped MH-PLL-NPs

The green fluorescent dye C6 could be easily incorporated into MH-PLL-NPs by the reprecipitation method with a doped-ratio of 1 wt. %. Under the excitation of a 450-nm light, the NPs aqueous dispersion gave green fluorescence (Fig. S5).

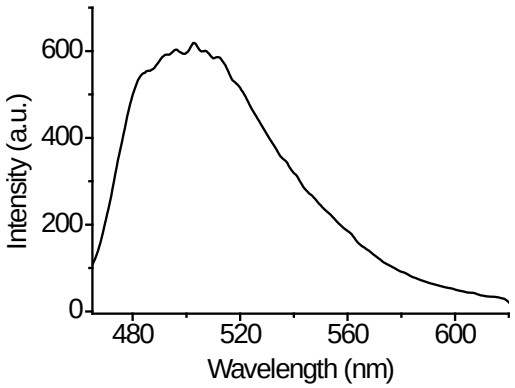


Fig. S5. Emission spectrum of C6-MH-PLL-NPs (ex. 450 nm).

Cytotoxicities of TPP- and GA- MH-PLL-NPs

(A) (B)

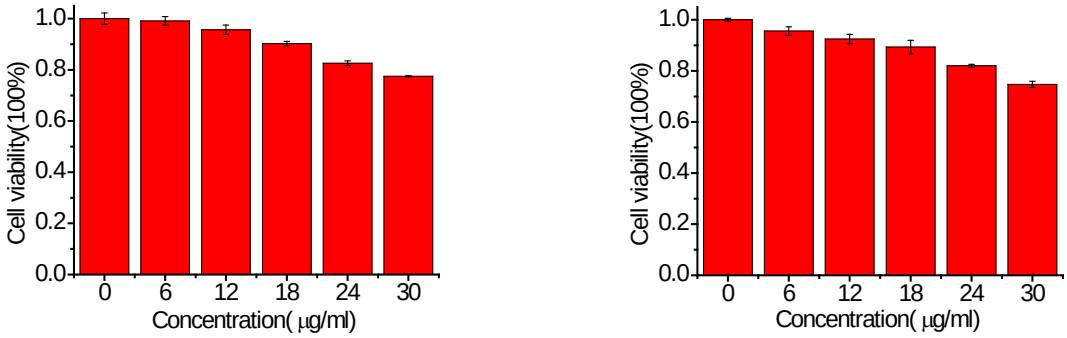


Fig. S6. HepG2 cells viability determined by MTT assay. Cells are incubated with (A) TPP-MH-PLL-NPs and (B) GA-MH-PLL-NPs at different concentrations respectively. No significant difference between control and test groups is observed for two kinds of NPs.