Supporting Information

A new near infrared photosensitizing nanoplatform containing blue-emitting up-conversion nanoparticles and hypocrellin A for photodynamic therapy of cancer cell

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Fig. S1 FT-IR spectra of (a) Tween 20-UCNPs and Tween 20; (b) Tween 20-UCNPs@HA and HA. In these four samples, it is clear to find that the strong and broad band around 3430/3491 cm$^{-1}$, corresponding to the O-H stretching vibrations, and the bands centered at 2927/2932 cm$^{-1}$ and 2863/2837 cm$^{-1}$, associated with the asymmetric ($\nu_{as}$) and symmetric ($\nu_s$) stretching vibrations of methylene (-CH$_2$), respectively. Stretching vibrations generated by O-C=O carboxylic group at 1565 cm$^{-1}$ and 1420 cm$^{-1}$ demonstrated the bound oleic acid while disappeared in Tween 20-UCNPs@HA due to strong signal of HA. Moreover, characteristic bands of C=O ester group and C-O-C group belong to Tween 20 are observed in (a) at 1735 cm$^{-1}$ and 1100 cm$^{-1}$, respectively, which are also found in Tween 20-UCNPs but greatly reduced (1733 cm$^{-1}$ and 1109 cm$^{-1}$). The C=O bands (1712 cm$^{-1}$ and 1710 cm$^{-1}$) also could be observed in (b) with three bands (1285 cm$^{-1}$, 1210 cm$^{-1}$ and 1162 cm$^{-1}$) belong to stretching vibrations of C-O-C groups. Band at 1460/1470/1454/1453 cm$^{-1}$ in all spectra attributed to $\nu_{as}$ of –CH$_3$ groups. The three bands (998 cm$^{-1}$, 912 cm$^{-1}$ and 814 cm$^{-1}$) observed in (b) are assigned to the deformation vibration of ring hydrogens.$^{1-6}$
**Fig. S2** (a) HA Loading amount of UCNPs versus increased concentrations of HA. (b) Cumulative HA released from Tween 20-UCNPs@HA in PBS (pH=7.4) under continuous stirring for different time at 37 °C. All these studies were repeated for three times.
**Fig. S3** Luminescent intensity changes of DPBF in acetonitrile (15 μL, 5 mM) dealt with 4 mL dispersion of Tween 20-UCNPs@PSs (2.5 mg/mL; a: HA; b: Ce6; c: ZnPc; d: MB) after 980 nm laser irradiation (0.8 W/cm²) for 10 min. (e) Up-conversion luminescence spectrum and (f) TEM image of NaYbF₄: Er UCNPs used in b-d.

**References:**


