Supplementary Materials for:

Smilax china-derived yellow-fluorescent carbon dots for temperature sensing, Cu^{2+} detection and cell imaging

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Apparatus

Transmission electron microscopy (TEM) studies were performed in a JEOL JEM-2100 instrument operating at an accelerating voltage of 200 kV. Samples for TEM measurements were prepared by placing a drop of colloidal solution on a carbon coated copper grid and then drying at room temperature. The UV-vis absorption spectrum was recorded by HITACHI U-2910 UV. The fluorescence spectrum was operated with a Hitachi F-4500 fluorescence spectrophotometer (Tokyo, Japan). Fourier transform infrared (FTIR) spectra were recorded on a Bruker tensor 2 spectrometer at a resolution of 4 cm^{-1}. A 1 mg sample (ratio 1:200) diluted in KBr was pressed into the pan.

Cell imaging

In a 5% CO_2 incubator, Neuroma PC12 cells in the exponential phase were seeded into 15 mm glass culture dishes at an initial density of 1 × 106 cells/mL with DMEM containing 10% FBS and incubated at 37°C. After incubation, the medium was discarded and PC12 cells were treated with mixture of y-CDs (1.2 mg/mL) and DMEM for 2 h. The extracellular y-CDs were removed by rinsing twice with phosphate buffer solutions (pH =7), and then cells were incubated with 1 mL PBS buffer (0.01 M) containing a range of concentration of Cu^{2+}. Immediately, fluorescence images were captured on laser scanning confocal microscope (LSCM).

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Fluorescence QY measurements

The relative fluorescence QY (Φ) of the y-CDs was calculated using the equation: $\Phi_x = \Phi_{std} I_x A_{std} \eta_x^2 / (I_{std} A_x \eta_{std}^2)$. The optical densities were measured using a Puxi TU-1901 UV–vis absorption spectrophotometer. In the equation, I_x and I_{std} are the fluorescence intensities of the y-CDs and the standard, respectively. A_x and A_{std} denote the optical densities (OD) of the y-CDs and the standard, respectively. Rhodamin 6G in ethanol was chosen as a standard with a QY of 0.94 at 488 nm. η_x and η_{std} denote the refractive indices of the y-CDs and the standard, respectively. The absorbances of all the samples in a 1.0 cm cuvette were kept under 0.1 at the excitation wavelength to minimize re-absorption effects.

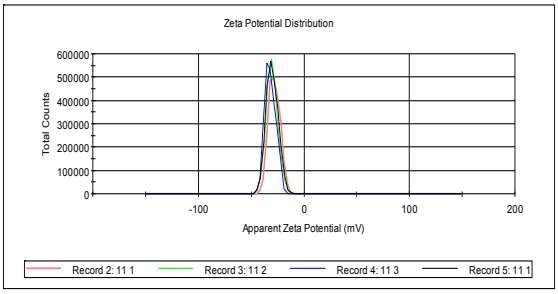

Fig. S1 Potential spectrum of obtained y-CDs for four records.

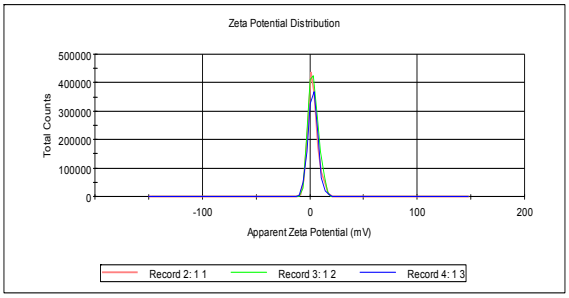

Fig. S2 Potential spectrum of obtained y-CDs/Cu^{2+} for three records.

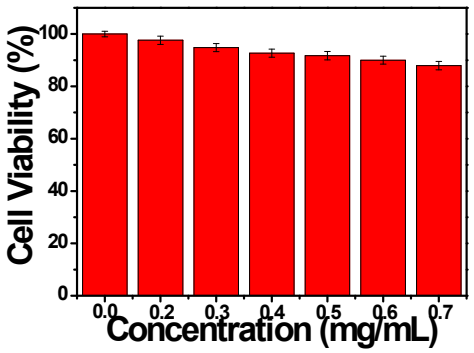

Fig. S3 Cytotoxic effect of obtained y-CDs on PC12 cells.

Table S1 Comparison of different fluorescent CDs based probes for Cu^{2+} detection.

Fluorescent probes	Starting material of synthesis	Detection limit	Ref.
CDs	Leeks	50 nM	[1]
N-CDs	Hexamethylenetetramine	90 nM	[2]
B, N-CDs	Aminophenylboronic acid	300 nM	[3]
BPEI[a] -CDs	Bamboo leaves and BPEI[a]	115 nM	[4]
N-CDs	Ethylene diamine	10^4 nM	[5]
S, N-CDs	Thiourea	50 nM	[6]
y-CDs	Smilax china	28 nM	This work

[a] Branched Poly(Ethylenimine).

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