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Quinoline derivative-functionalized carbon dots as a fluorescent nanosensor for sensing and intracellular imaging of Zn^{2+}

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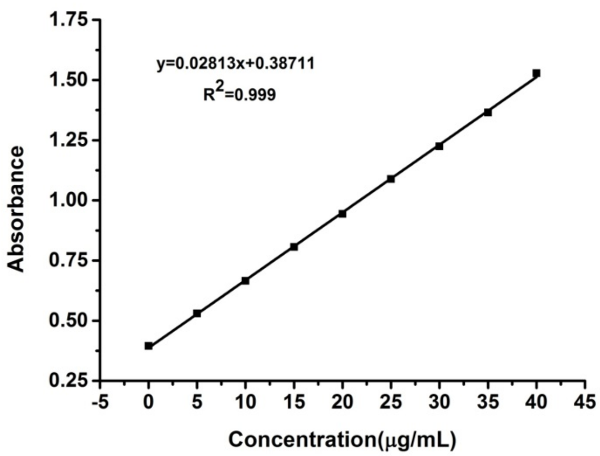

Fig. S1 Plot of the absorbance intensity at 317 nm as a function of the compound A concentration in the presence of 100 μg mL^{-1} the nanosensor.

According to the UV-Vis absorbance spectra of compound A and the nanosensor (Fig 2A), it can be observed that the nanosensor present a typical absorbance peak at 317 nm originated from compound A. Therefore, for the detection of the content of compound A in the nanosensor, standard addition experiments were performed with the nanosensor sample, where different concentrations of compound A (5.0, 10.0, 15.0, 20.0, 25.0, 30.0, 35.0, 40.0 μg mL^{-1}) were added into 100 μg mL^{-1} of the nanosensor, and then the absorbance intensities of the mixtures at 317 nm were measured. According to the intercept of the calibration curve and the *x*-axis, the content of compound A was measured to be 13.76 µg per 100.0 µg of the nanosensor (Fig S1).

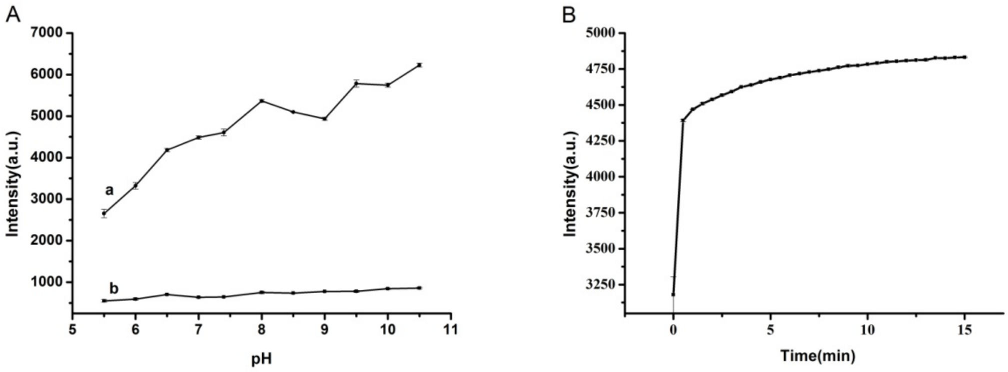

Fig. S2 (A) Plot of the fluorescence intensity of the nanosensor (150.0 µg mL^{-1}) as a function of the pH values of the tris-HCl buffer: a) in the presence of Zn^{2+} (50.0 µM); b) in the absence of Zn^{2+}. (B) Plot of the fluorescence intensity of the nanosensor (150.0 µg mL^{-1}) in the presence of 50.0 µM Zn^{2+} as a function of the response time.

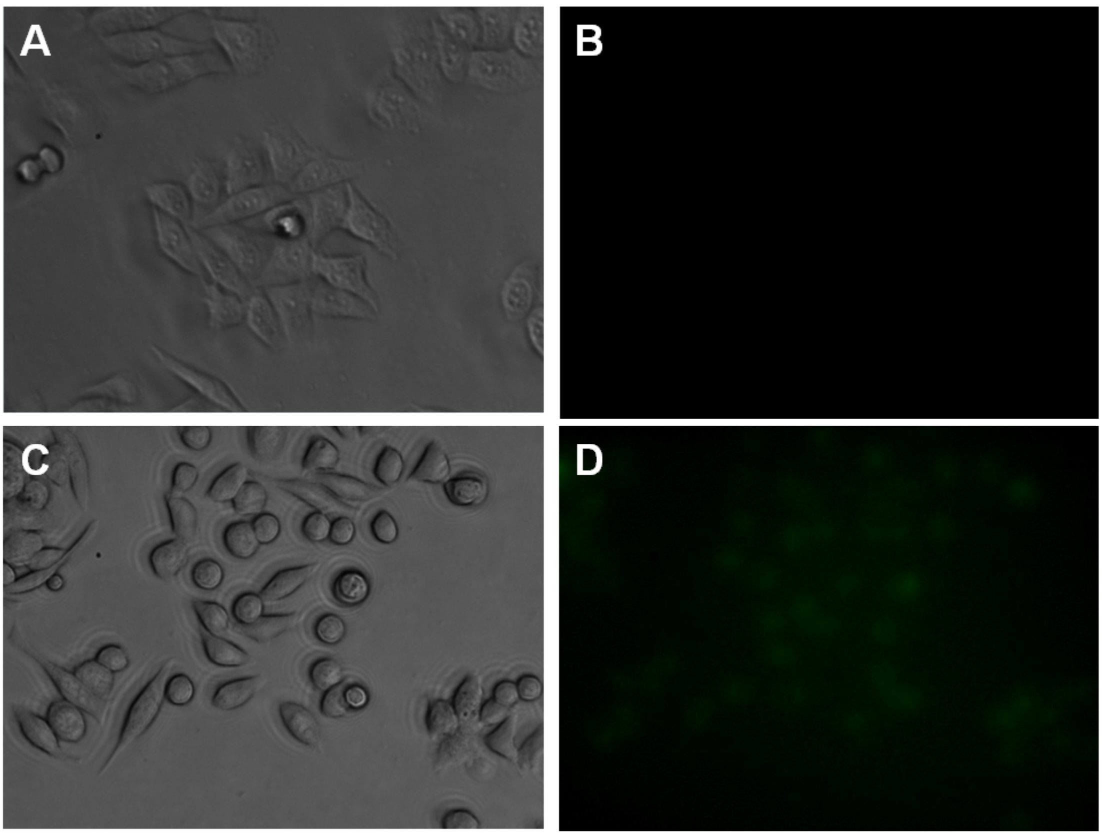

Fig. S3 Fluorescence image of HeLa cells incubated with 250 μg mL^{-1} compound A (A, B) and 250 μg mL^{-1} the nanosensor (C, D) after the exogenous Zn source treatment (addition of 50 μM $ZnCl_2$). (A, C) the bright-field images; (B, D) the fluorescence images.

Table S1. Comparison of different optical sensors for Zinc ion determination

Probe	**Mode**	**Linear range**	**LOD**	**Response time**	**Ref**
PDI-DIDPA	Fluorescence	0.1-4 μM	32 nM	Not Given	1
8-aminoquinoline functionalized SiNPs	Fluorescence	0.01-100 μM	Not given	Not Given	2
Carboxymethyl chitosan-coated CdTe QDs	Fluorescence	5 μM-5 mM	4.5 μM	40 mins	3
CdSe/ZnS QD-zincon conjugates	Fluorescence	10-1000 μM	0.57 μM	1 h	4
1,8-naphthalimide derivative	Fluorescence	0-4 μM	200 nM	3 mins	5
Salicylaldehyde hydrazones-based “turn-on” fluorescent chemosensor	Fluorescence Absorbance	0.10-10.0 μM	25 nM	2 mins	6
Fe_3O_4@SiO_2-Rho NPs	Absorbance	0.001-1 mM	Not given	3 mins	7
A pyridoxal-based dual chemosensor	Fluorescence	0-200 μM	21 nM	Not Given	8
(DPA-DTC)/ (P-DTC) co-capped CdSe/ZnS QDs	Fluorescence	0.9-16 μM	0.7 μM	9 mins	9
MPA-capped CdTe QDs	Fluorescence	1.6-35 μM	1.2 μM	7 mins	10
This work	Fluorescence	0.1-2 μM	6.4 nM	1 min	---

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