Ultrasensitive electrochemical cytosensor for highly specific detection of HL-60 cancer cells based on metal ion functionalized titanium phosphate nanospheres

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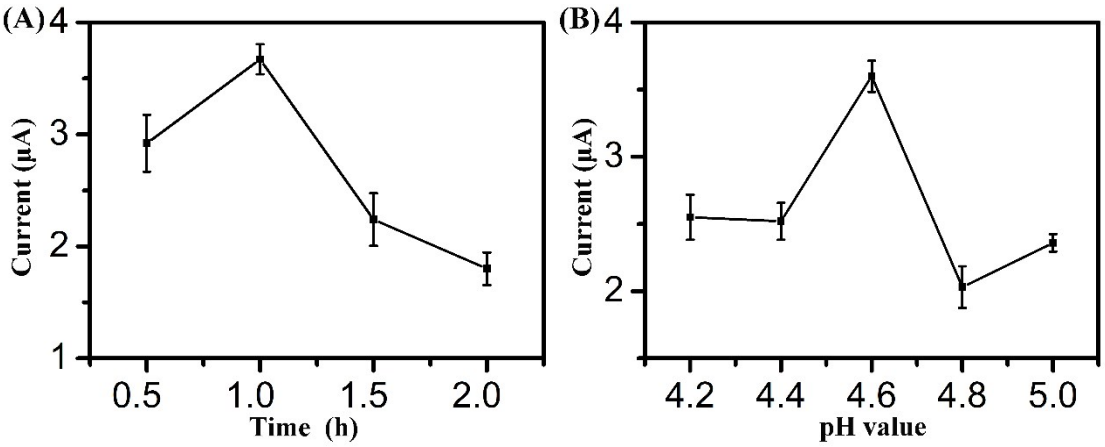

Figure S1. Effects of cell incubation time (A) and pH value (B)

Table S1 Detection limits of various cytosensors

	Signal Probes	Cell Types	LOD	Linear range	Ref
1	Fe_3O_4/MnO_2/Au@Pd nanoelectrocatalysts and enzyme for signal amplification	HepG2	15 cells mL^{-1}	$1\times10^2 \sim 1\times10^7$ cells mL^{-1}	3
2	Sgc8c-functionalized cathode and a nitrogen-doped graphene/gold nanoparticles/glucose oxidase anode	CCRF-CEM	4 cells	5~50000 cells	40
3	An indium tin oxide electrode array and multifunctional nanoprobe	HepG2	10 cells mL^{-1}	10^2 to 10^7 cells mL^{-1}	28
4	PNT-CS-modified electrodes using the electrochemical impedance method	K562	630 cells mL^{-1}	5×10^3~5×10^7 cells mL^{-1}	22
5	Fe_3O_4@Ag−Pd Nanoelectrocatalysts for signal amplification	MCF-7 T47D	34 cells mL^{-1} 42 cells mL^{-1}	50~1 × 10^7 cells mL^{-1}	29
6	Peroxidase-mimetic Au nanoflower decorated graphene-hemin composite	K562	10 cells mL^{-1}	10~5.0× 10^4 cells mL^{-1}	24
7	Cd^{2+} ion functionalized titanium phosphate nanospheres for signal amplification	HL-60	35 cells mL^{-1}	10^2~ 1×10^7 cells mL^{-1}	present work

Table S2 The reliability of the proposed method applied in detection of HL-60 in human serum

Concentration of Added HL-60 cells (cells/mL)	Measured concentration of HL-60 cells (cells/mL)	Relative error %
Blank	7	——
500	549±12	9.8
1000	1073±184	14.6
5000	4530±737	9.4
10000	10410±1694	4.1

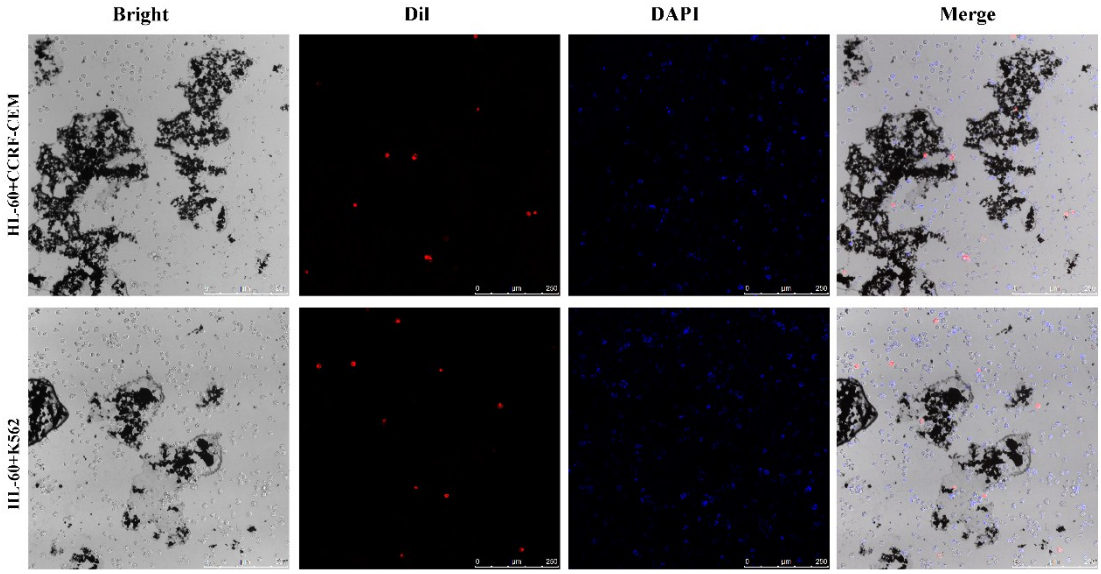

Figure S2 Fluorescence microscopy images of (A) CCRF-CEM cells stained by Dil and HL-60 cells stained by DAPI, and (B) K562 cells stained by Dil and HL-60 cells stained by DAPI captrued on KH1C12/c-MWNT observed under confocal fluorescence microscope.

Carboxyl-MWNT was modified on the bottom of petri dish, and the KH1C12 was attached to the c-MWNT. BSA was used to remove unattached KH1C12. 1 mL culture solution containing 4×10^4 HL-60 cells stained with DAPI (λ_{ex}=364 nm, λ_{em}=454 nm) and 4×10^4 CCRF-CEM cells (or K562 cells) stained with Dil (λ_{ex}=549 nm, λ_{em}=565 nm) were observed under confocal fluorescence microscope/Inverted Fluorescence microscope. As Figure S2 showed little CCRF-CEM cells or K562 cells was captured by KH1C12/c-MWNT, indicating the excellent specificity of our present cytosensor.