Supporting Information

A fluorescent sensor based on aggregation-induced emission: Highly sensitive detection for hydrazine and application in living cell imaging

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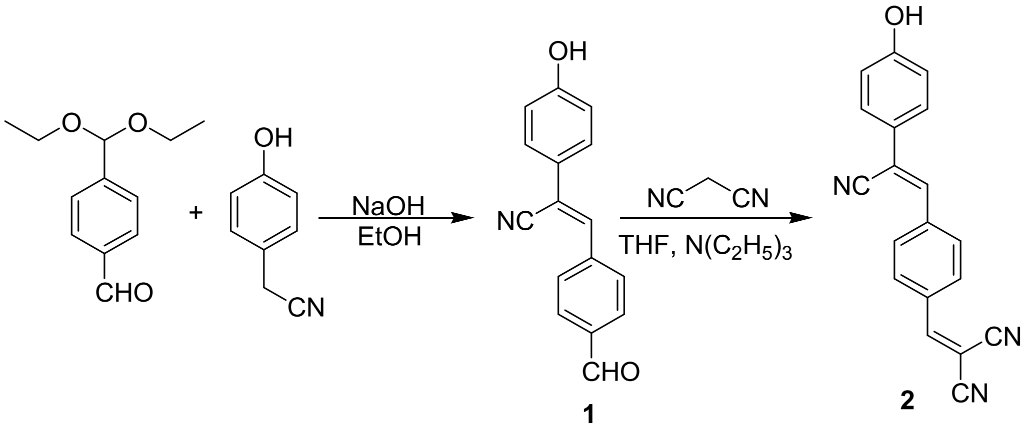
1. General

All chemical reagents were obtained from J&K Chemicals and were used directly. TLC analysis wasdone on pre-coated glass plates. Silica gel (200-300 mesh) was used for the purification of column chromatography. NMR spectra were investigated on a Bruker-ARX 400 instrument at 25°C. MS spectra were measured onBruker mass spectrometer.

2. The synthetic process and characteristic spectra.



Scheme S1 The synthetic route for target compound **2**

2.1 Synthesis ofcompound1.

Under nitrogen atmosphere, 4-hydroxybenzene acetonitrile (2.663g, 20mmol) and 4-(diethoxymethyl)benzaldehyde (4.165g, 20mmol) were dissolved in 80mL of enthanol. Then sodium hydroxide (0.8 g, 20mmol) were added in it and the mixture was stirred and refluxed for 6 h.The color of mixture was turned to brown gradually.TLC detection showed that all the starting materials were consumed.After reaction, the mixture was cooled to room temperature and the solvent was evaporated under reduced pressure. 50 mL ofNH_4Cl solution (1M) were added and the precipitate was formed. The precipitate was filtered and purified by recrystallization in MeOH/water (1:1, *V*/*V*). After dryness, compound **1** was collectedas pale yellow solid in yield of 85%.^{1}H NMR(400 MHz, $CDCl_3$) : δppm: 6.90(d,*J* = 8.0 Hz, 2H, ArH), 7.63(d,*J* = 8.0 Hz, 2H, ArH),7.93(s,1H, C=CH), 8.01 (d,*J* = 8.0 Hz, 2H, ArH), 8.05 (d,*J* = 8.0 Hz, 2H, ArH),10.03(s,1H, CHO), 10.11(s,1H, OH)**.** ^{13}C NMR (100 MHz, DMSO-d_6), *δ*ppm: 192.89, 159.73, 140.04, 138.26, 136.78, 130.26, 129.56, 127.97, 124.53, 118.02,v116.54, 113.67. MALDI-TOF-MS ($C_{16}H_{11}NO_2$) Calcd.for *m*/*z* =249.08, found: *m*/*z* =249.41 (M^+). Anal.calcd for $C_{16}H_{11}NO_2$: C 77.10, H 4.45, N 5.62; found C 77.04, H 4.41, N 5.68.

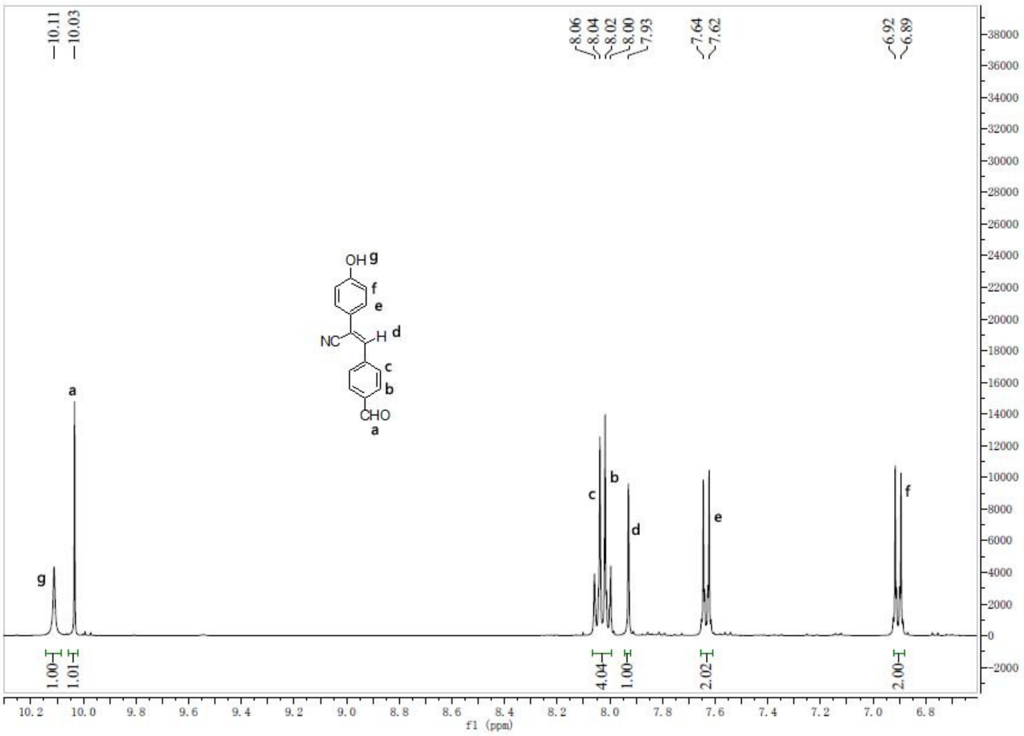


Figure S1. The ^{1}H NMR spectrum of compound **1**

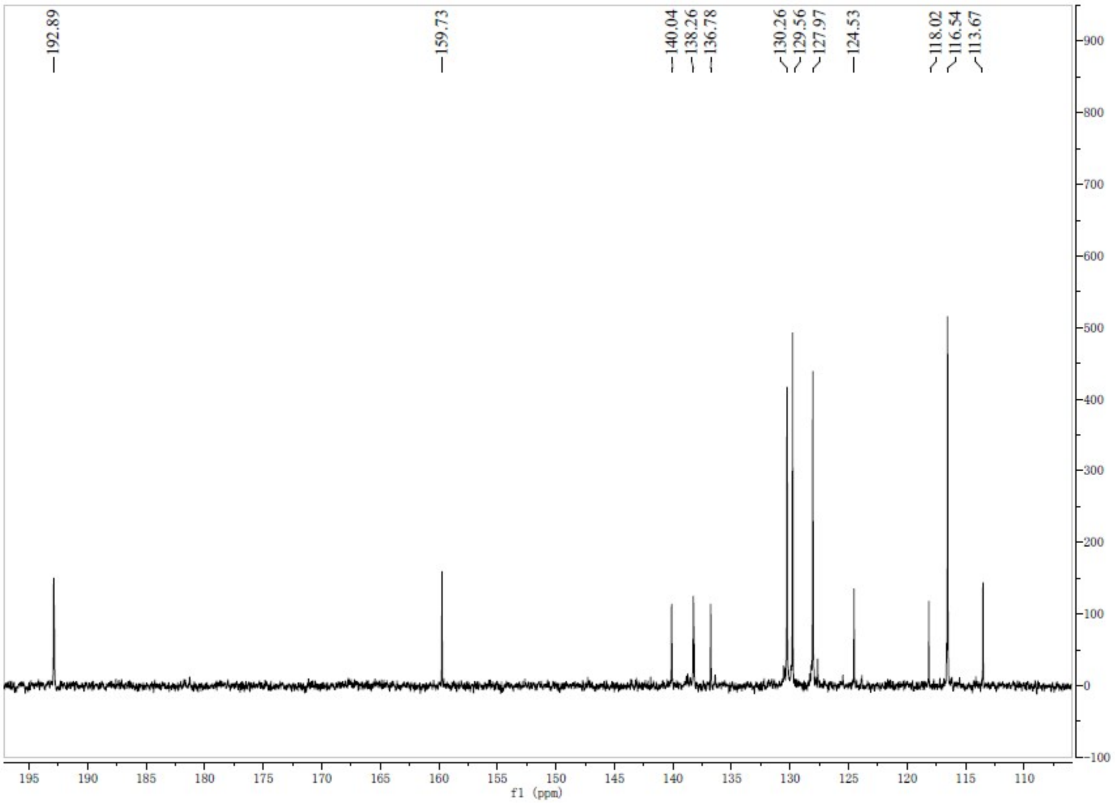


Figure S2. The ^{1}H NMR spectrum of compound **1**

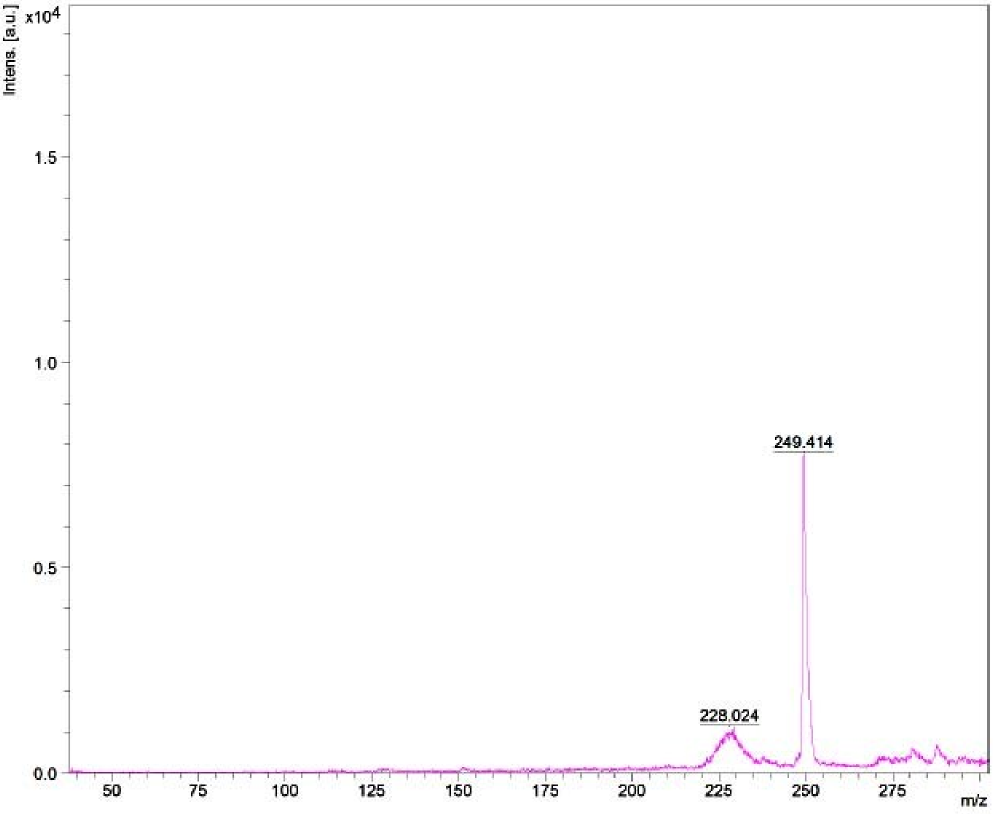


Figure S3. MALDI-TOF-MS spectrum of compound **1**

2.2 Synthesis of compound 2.

Under the protection of N_2 atomosphere, compound **1** (0.1245g, 0.5mmol) and malononitrile (0.033g, 0.6mmol) were dissolved in 50 mL of dry tetrahydrofuran. Then three drops of triethylamine was added in the reaction system as catalysts. The color of reaction mixture turned to orange gradually under stirring. TLC detection suggested that compound **1** was consumed thoroughly overnight. Then the solvent was evaporated in vacuum pressure condition at 35 ^{o}C. The residue was extracted by 50 mL of dichloroethane. The organic solution was concentrated under reduced pressure and was purified by silica gel column chromatography (eluent: CH_2Cl_2/ petroleum ether=1:2). The orange compound **2** was obtained in yield of 90%. 1H NMR (400 MHz, DMSO-d_6), δppm: 6.91(d, 2H, J = 8.0 Hz, ArH), 7.65(d, 2H, J = 8.0 Hz, ArH), 7.93 (s, 1H, OH), 8.06(bs, 4H, ArH), 8.55(s, 1H, CH=CCN), 10.08(s, 1H, CH=C(CN)$_2$). ^{13}C NMR (100 MHz, DMSO-d_6), δppm: 160.69, 159.72, 139.77, 137.83, 132.48, 131.35, 129.95, 128.21, 124.45, 118.06, 116.57, 114.73, 113.91, 113.58. HR-MS (ESI) ($C_{19}H_{11}N_3O$) [MK]+: Calcd: 336.0539. Found:336.0541. Anal.calcd for $C_{19}H_{11}N_3O$: C 76.76, H 3.73, N 14.13; found C 76.71, H 3.71, N 14.17.

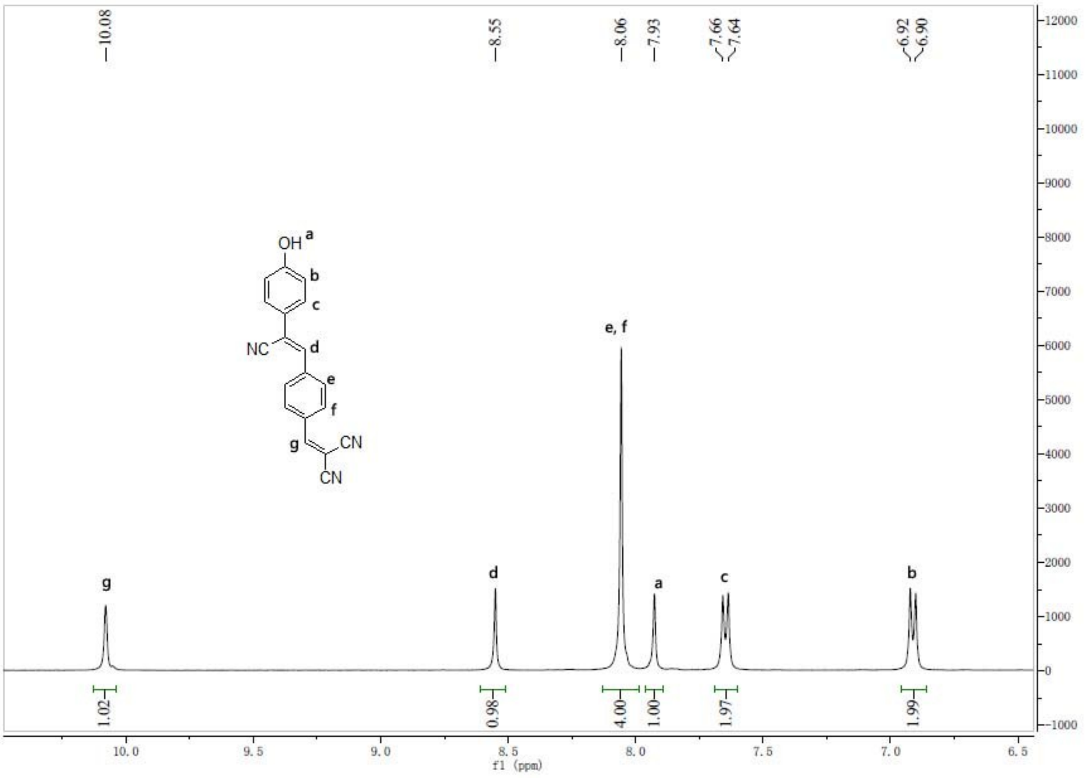


Figure S4. The ^{1}H NMR spectrum of compound **2**

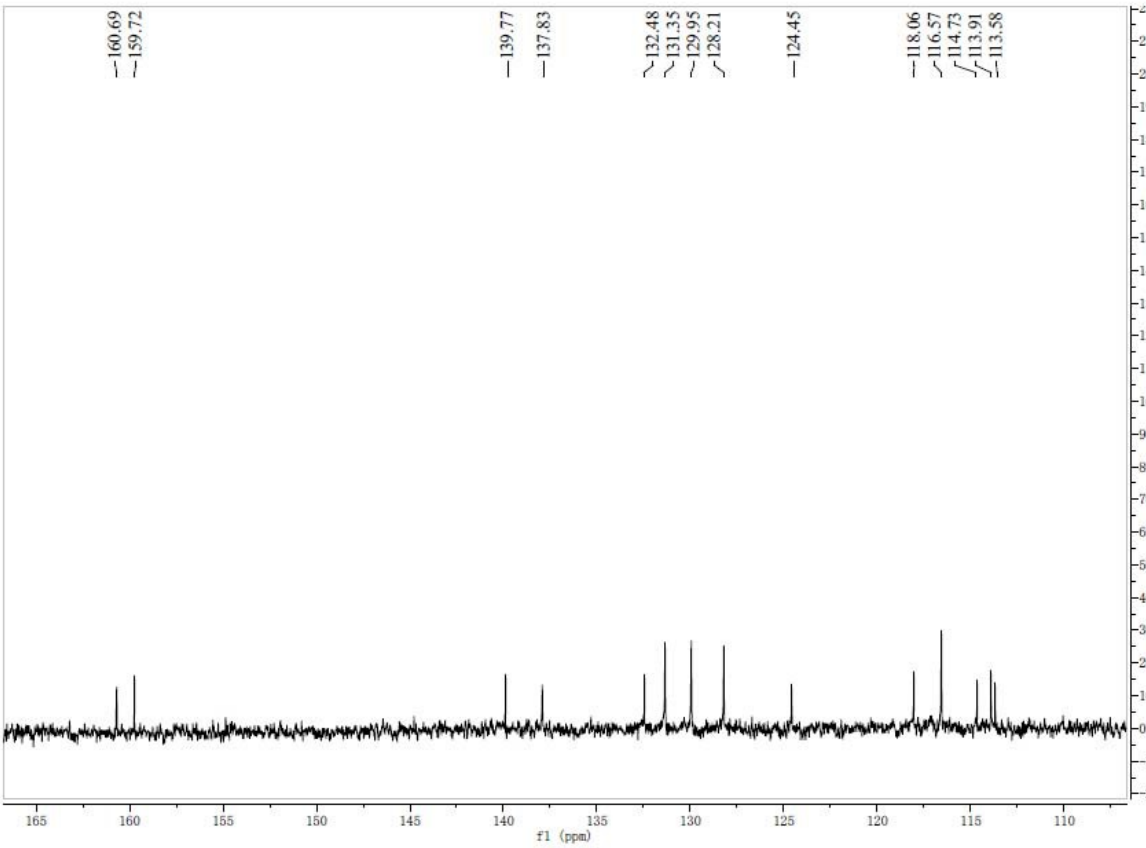


Figure S5. The ^{13}C NMR spectrum of compound **2**

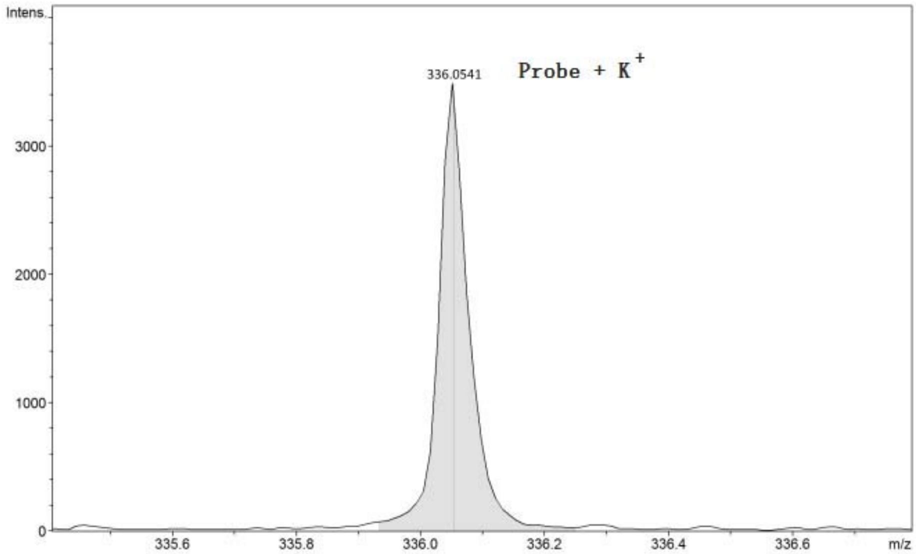


Figure S6. The HR-MS spectrum of compound **2**

3. TICT effect

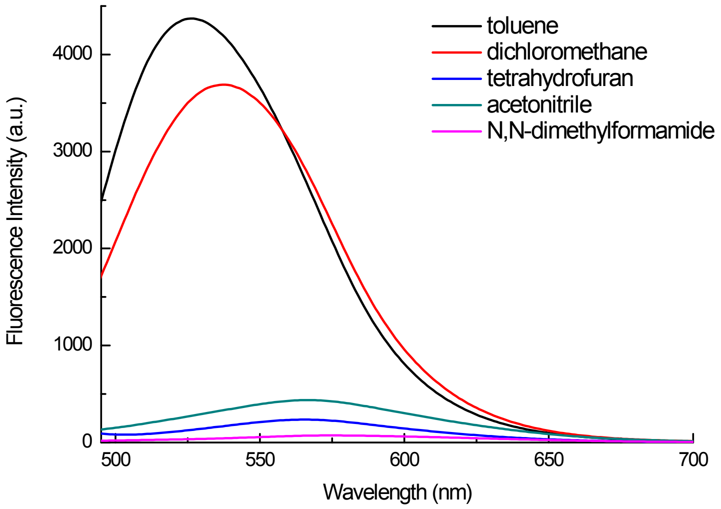


Figure S7. Fluorescence spectra of sample **2** (10 μM) in different kinds of solutions. $\lambda_{ex} = 370$ nm

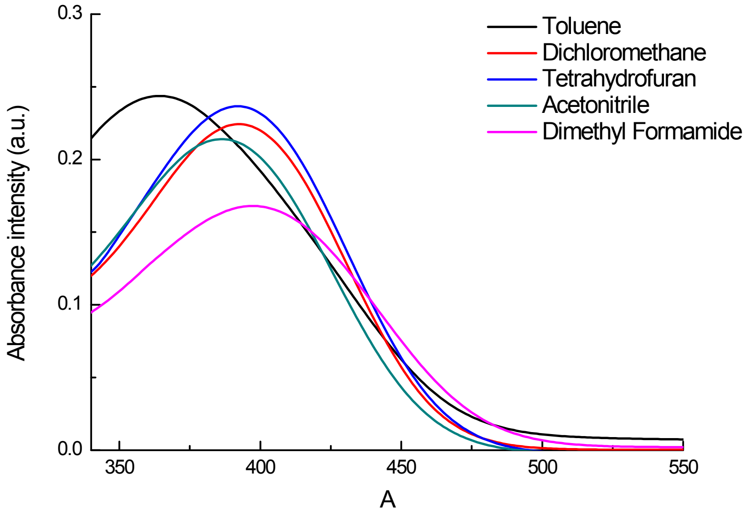


Figure S8. Absorption spectra of sample **2** (10 μM) in different kinds of solutions.

4. Test for cell viability

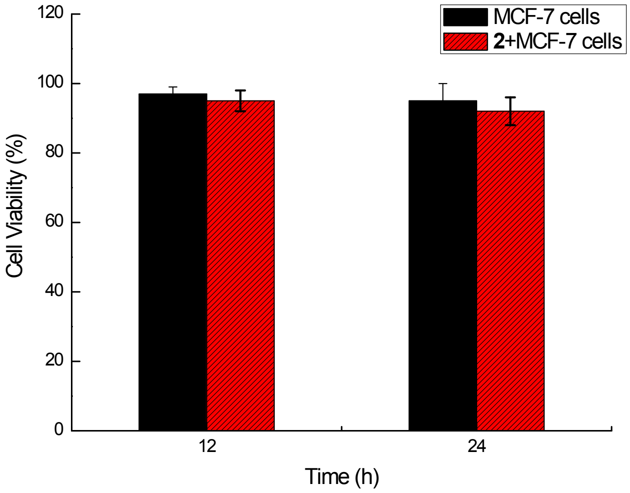


Figure S9 Cell viability of MCF-7 cells before and after incubated with compound **2** (1.0×10^{-5} M) for 12 h and 24 h.