Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Enhanced proliferation inhibition of HL60 cells treated by synergistic all-*trans* retinoic acid/blue light/nanodiamonds

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Supplementary Experimental section

Preparations of materials, cell line and various equipment

Materials All *trans* retinoic acid (ATRA) was from Sigma-Aldrich, USA. Sulfuric acid, and nitric acid were from Baijin Reagent Co., Ltd. China. Nanodiamond was from Tianjin Qianyu Superhard Polytron Technologies Inc. China. Roswell Park Memorial Institute (RPMI) 1640 medium was from Gibco, USA. 10% fetal bovine serum (FBS) was from Zhejiang Tianhang Biotechnology Co., Ltd. China. Cell Counting Kit-8 assay, Annexin-FITC Apotosis Kit, Caspase-3 Activity Assay Kit, and Braford assay Kit were from Shanghai BestBio Biotechnology Co., Ltd. China. Cellular Reactive Oxygen Species Detection Assay Kit was from Beyotime Biotechnology Inc. China. RNA Isolation kit, Reverse transcription kits, and SYBR Premix Ex Taq™ kit were from Takara Biotechnology Co., Ltd. China. Ultrapure Milli-Q water was used in all experiments.

Cell line HL60 cells (human promyelocytic leukaemia) were from the School of Translational Medicine, Jilin University, China.

Equipments ELX 808 microplate reader (Bio-Tek, US). FACScan flow cytometry (Becton Dickinson, USA). ABI Prism 7500 Sequence Detection System (Applied Biosystems, FosterCity, CA, USA).

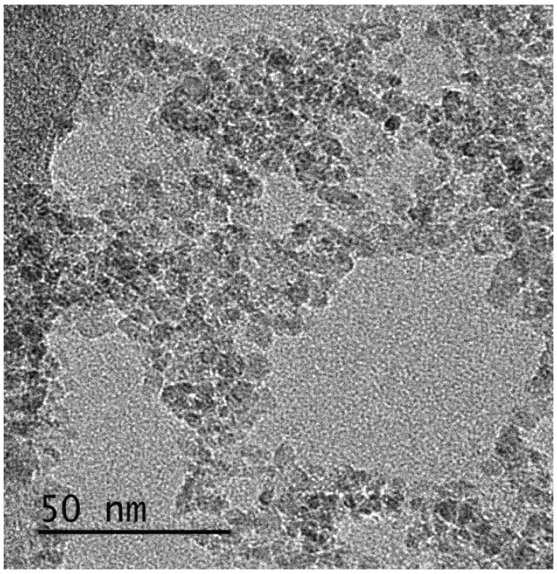

Fig. S1. TEM image of the ATRA-ND samples. The sizes of NDs are in the region of 5−10 nm. The evidence of ATRA molecules on ND surfaces is presented, showing the interactions of drug and NDs.

(a) **(b)**

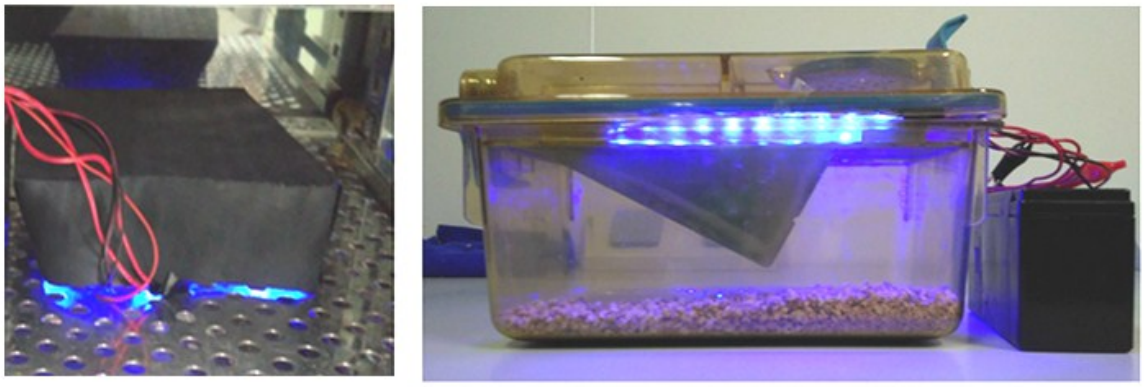

Fig. S2. The optical pictures of blue LEDs with blue light irradiation setup for in vitro experiments (a) and in vivo experiments (b).The shading box size in (a), length: 20 cm, width: 15 cm and height: 10 cm. The assay kit tested was put at the top inside of the shading box. The chamber size in (b), length: 32 cm, width: 19 cm and height: 12 cm.

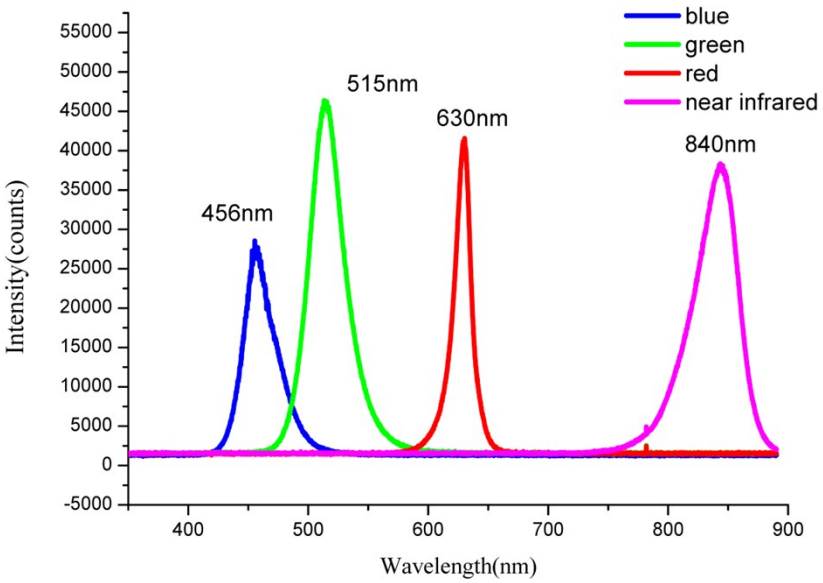

Fig. S3. The emission spectra of the commercial LEDs. From left to right, the emission peaks centered at 456 nm, 515 nm, 630 nm, 840 nm are from blue, green, red, near infrared LEDs, in turn.

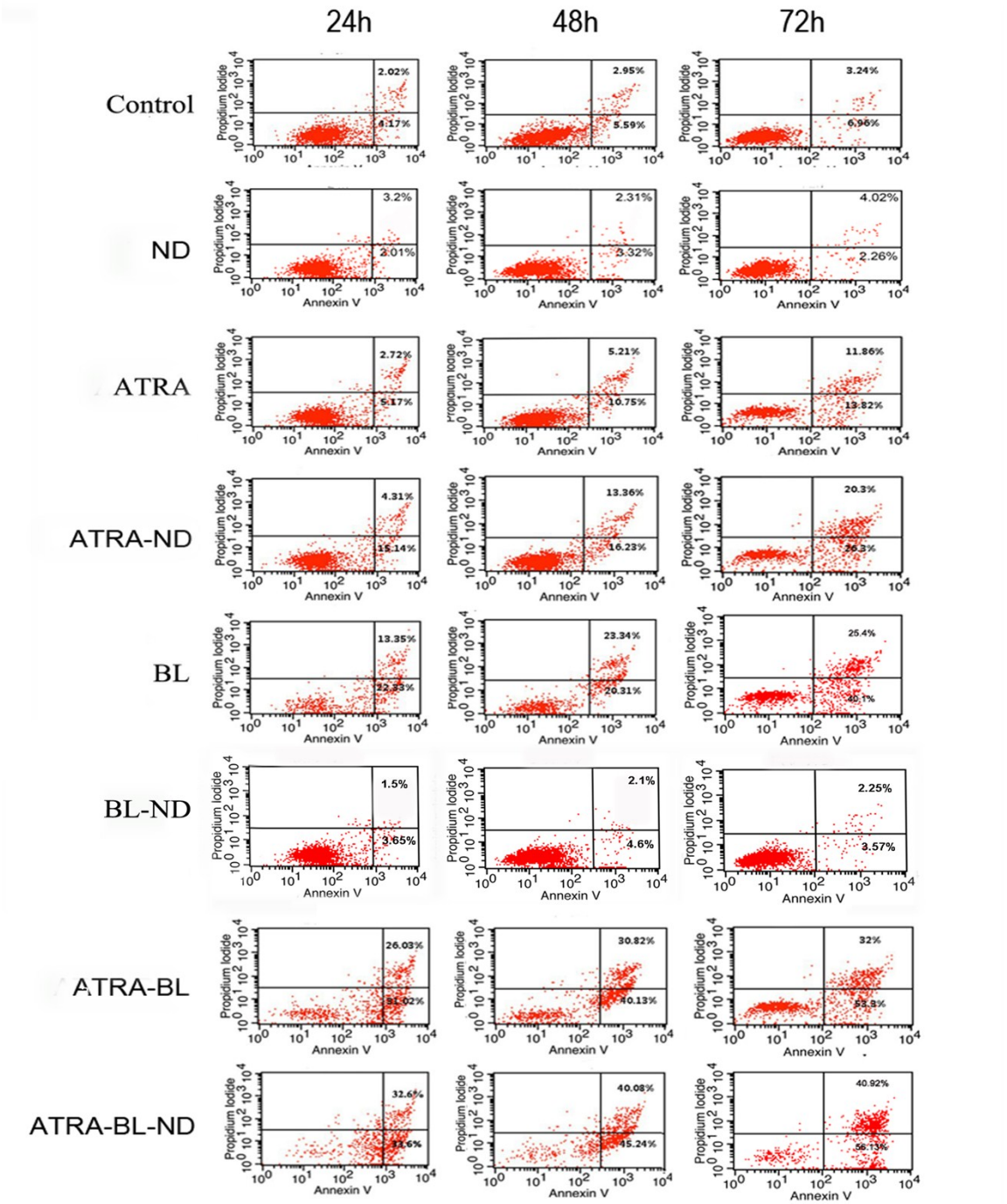

Fig. S4. Assessing the cell apoptosis ratios of HL60 cells treated under various conditions with Control, ND, ATRA, ATRA-ND, BL, ATRA-BL, and ATRA-BL-ND after 24 h (1 day), 48 (2 days) and 72 h (3 days), followed by Annexin V-FITC/PI double staining. BL irradiations were continuously lasted for 12 h each day. The fluorescence intensity of 2×10^4 cells were measured and analyzed by FACScan flow cytometry for Annexin V-FITC (with the excitation wavelength at 488 nm and emission wavelength at 525 nm) and PI (with the excitation wavelength at 488 nm and emission wavelength at 620 nm). The apoptosis ratios were obtained by the Cell Quest software (Becton Dickinson), calculated by the sum of number proportions of the early (the lower right quadrant) and late apoptotic cells (the upper right quadrant) to total cells tested.