Electronic Supplementary Material (ESI) for Chemical Science.
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Supplementary Information

for

A dual functional ruthenium arene complex induces differentiation and apoptosis of acute promyelocytic leukemia cells

Supporting Figures

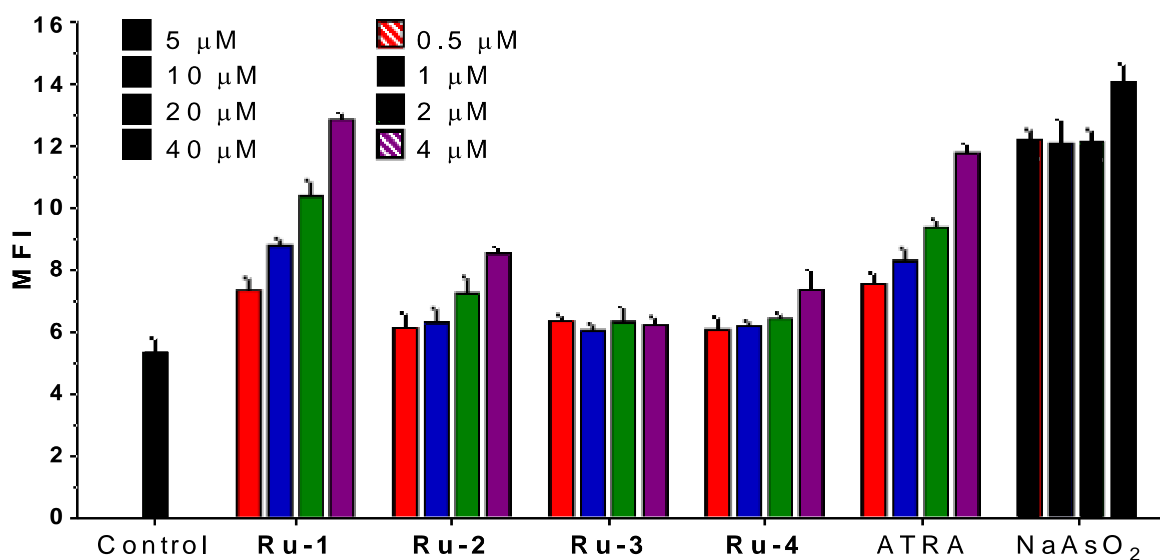

Fig. S1 The expression of the myeloid surface marker CD11b on NB4 cells. NB4 cells were incubated with the different amount of drugs for 3 days. The mean fluorescence intensity was quantified by flow cytometry with CD11b-FITC antibody.

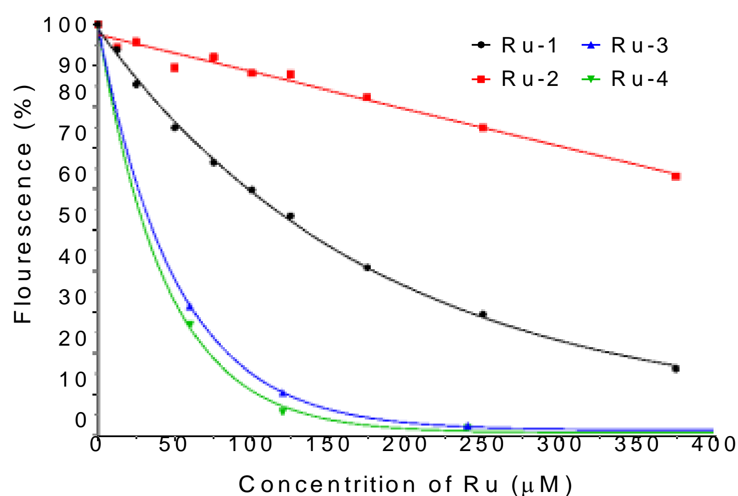

Fig. S2 Fluorescence decrease of PML with the titration of ruthenium compounds. The measurement was conducted on 30 μM Zn-PML at 37℃ for 2 hours in 20 mM phosphate buffer (pH = 7.0).

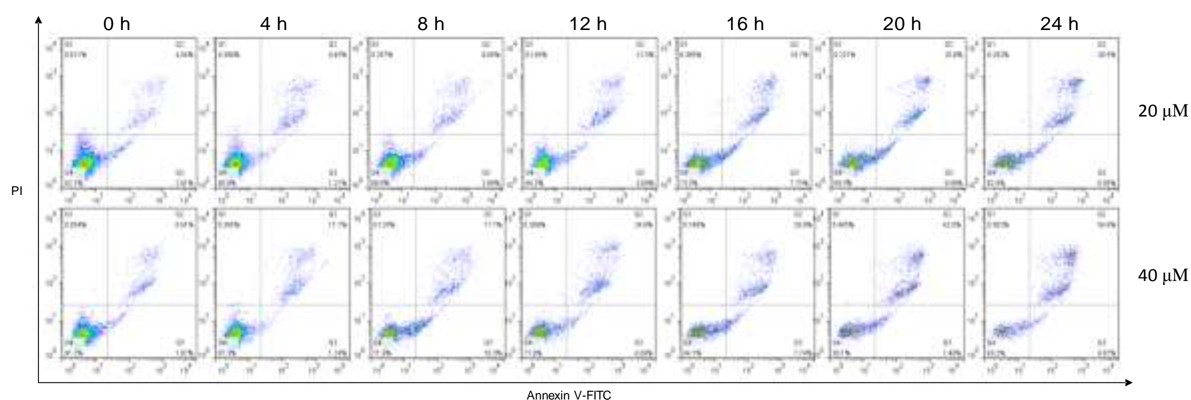

Fig. S3 Ru-1 induces the apoptosis of NB4 cells. The cell apoptosis profiles were determined by flow cytometry with Annexin V-FITC/PI dual-staining after the treatment of **Ru-1**.

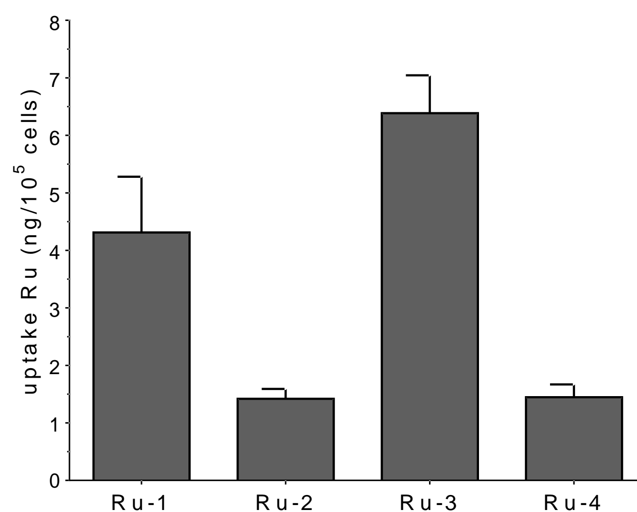

Fig. S4 The cellular accumulation of Ru(II) complexes. Ruthenium uptake in NB4 cells was determined using ICP-MS after 4 h treatment of the 100 μM ruthenium agents.

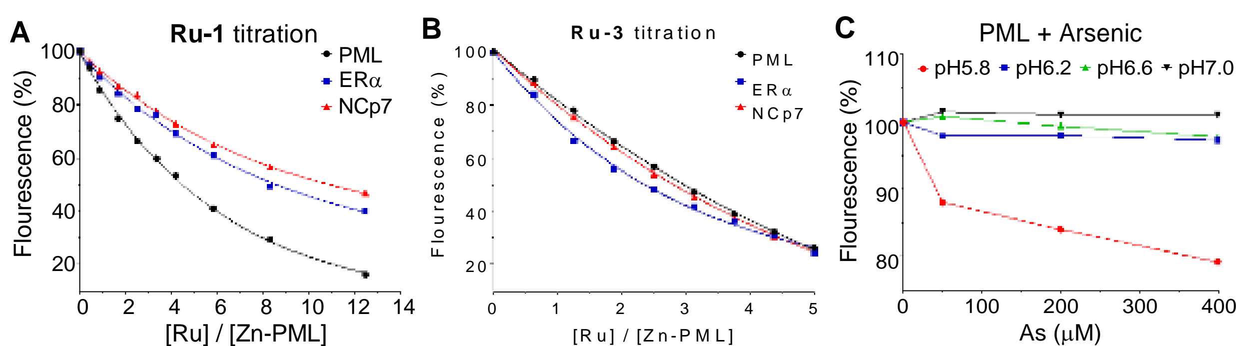

Fig. S5 (A) Fluorescence spectra of protein with the titration of **Ru-1**. The measurement was conducted on 30 μM Zn-protein at 37℃ for 2 hours in 20 mM phosphate buffer (pH 7.0). (B) Fluorescence spectra of protein with the titration of **Ru-3**. The measurement was conducted on 20 μM Zn-protein at 37℃ for 2 hours in 20 mM phosphate buffer (pH 7.0). (C) Fluorescence of PML quenched by arsenite. 30 μM proteins were incubated with arsenite at 37°C for 2 hours in the presence of 20 mM phosphate buffer.

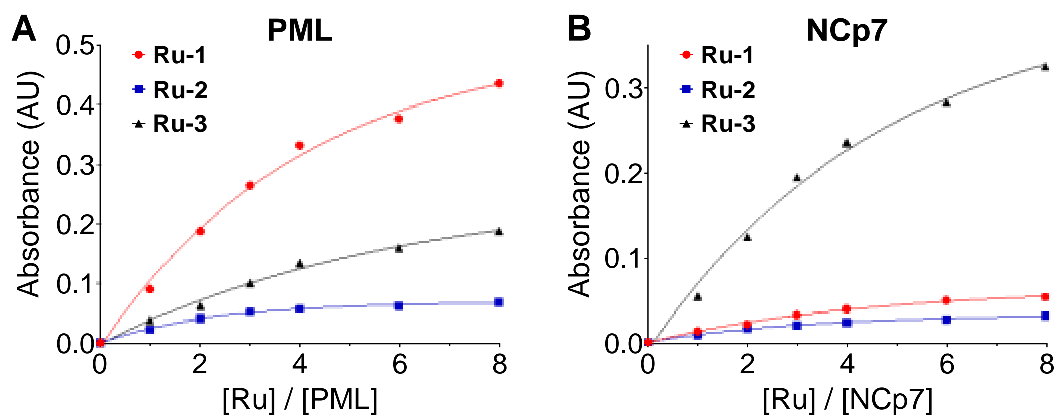

Fig. S6. Comparison of zinc-release of PML (A) and NCp7 (B) induced by Ru-agents. The zinc release assay was measured on 20 μM protein with the reaction of ruthenium complexes at 37°C for 2 h. UV absorption at 620 nm was measured in the presence of 400 μM Zincon.

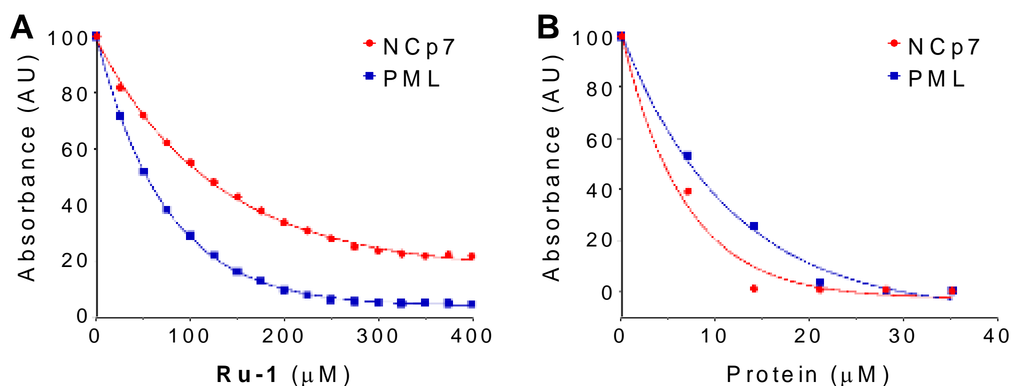

Fig. S7 (A) Fluorescence of PML and NCp7 quenched by **Ru-1**. 20 μM proteins were incubated with **Ru-1** at 37℃ for 30 min in the presence of 20 mM phosphate buffer. (B) UV absorbance of $Zn(PAR)_2$ at 500 nm in the reaction with PML and NCp7. Proteins were titrated to 15 μM $Zn(PAR)_2$ in 20 mM phosphate buffer in the presence of 20 μM additional PAR to eliminate free Zn(II) ions. All reactions were performed at 37℃. The color denotes the protein PML (blue) or NCp7 (red).

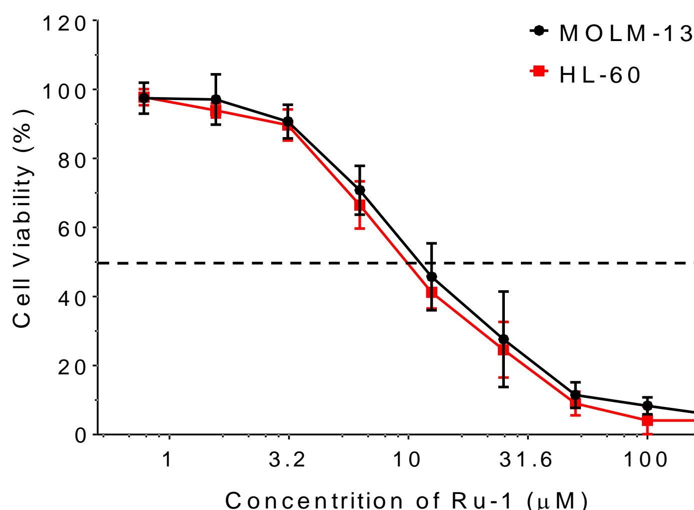

Fig. S8 The inhibition of MOLM-13 and HL-60 cell proliferation by **Ru-1**. Cells were treated with **Ru-1** for 72 h before MTT assay.

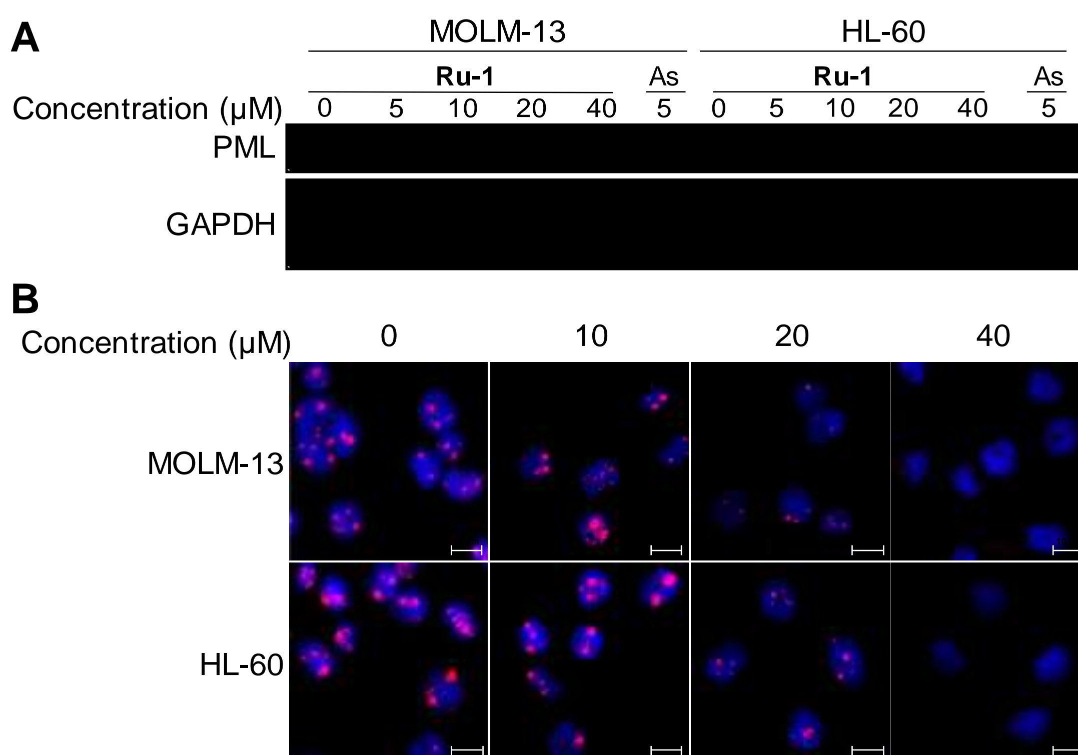

Fig. S9 The degradation of PML in MOLM-13 and HL-60 cells. (A) The PML level in MOLM-13 and HL-60 cells with the treatment of **Ru-1** for 24 h. The protein was assessed by western blotting with PML antibody. (B) Dose dependent degradation of PML in MOLM-13 and HL-60 cells with the treatment of **Ru-1** for 24 h. The PML protein in cells was measured using immunofluorescence staining with PML antibody (red). The nuclei were stained with DAPI (blue). Scale bar, 10 μm.

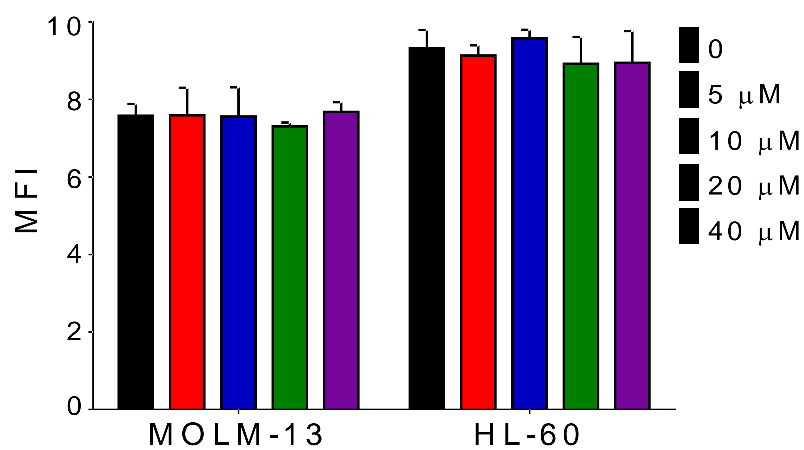

Fig. S10 The expression of the myeloid surface marker CD11b on MOLM-13 and HL-60 cells. Cells were incubated with **Ru-1** for 3 days. The mean fluorescence intensity (MFI) was quantified by flow cytometry with CD11b-FITC antibody.