**Supplementary Figure 1. ADA-07 synthesis, MS analysis and cytotoxicity assays.** A, synthesis of ADA-07. Step 1, preparation of 5-(adamantan-1-yl) indoline-2,3-dione: triflic acid (1.95 g, 13 mmol) was added to a stirred solution of isatin (1.47 g, 10 mmol) and 1-adamantanol (1.52 g, 10 mmol) in trifluoroacetic acid (10 mL). The resulting mixture was stirred at 75°C for 6 h. After this time, the reaction mixture was cooled to room temperature and diluted with EtOH/H2O 2 : 8 (50 mL). The obtained red precipitate was filtered and purified by column chromatography (10% methanol in DCM). Step 2, preparation of 5-(adamantan-1-yl)-3- (hydroxyimino)indolin-2-one (ADA-07): hydroxylamine hydrochloride (0.74 g, 1.5 eq) was added to the stirred solution of 5-(adamantan-1-yl)indoline-2,3-dione (2.0 g) in ethanol (20 ml), and the mixture was refluxed for about 3 h. After completion of the reaction, the solvent was evaporated and purified by column chromatography (5% methanol in DCM). B, the ABSciex TripleTOFTM5600 system that was coupled with the DuoSpray TM ion source was used to measure the molecular mass of ADA-07. A final concentration of 10 M ADA-07 was directly infused into the ion source at a flow rate of 2 L/min. The mass spectrometer was operated in negative ion mode from m/z 100 to m/z 1000 for 0.5 min. All scans were summed to generate the final ADA-07 spectrum. C, ADA-07 has no cytotoxicity against the JB6 P+ mouse epidermal skin cell line. D, ADA-07 has no cytotoxicity against normal human dermal fibroblasts (NHDF). Cells (1 × 104 cells/well) were seeded into 96-well plates. After an overnight incubation, cells were treated with different concentrations of ADA-07 and incubated for 24 or 48 h. Then 20 μL of the CellTiter 96 Aqueous One Solution (Promega, Madison, WI) were added to each well and cells were incubated for an additional 1 h at 37°C. Absorbance was measured at an optical density of 492 and 690 nm using the Thermo Multiskan plate-reader (Thermo Fisher Scientific, Waltham, MA).

**Supplementary Figure 2. The expression level of TOPK in normal skin cells (JB6 P+, NHDF) and skin cancer cells (A431 and SCC12).** TOPK expression was assessed by Western blot using a specific antibody and β-actin was used as a loading control.

**Supplementary Figure 3. Measurement of ADA-07 absorbance by spectrophotometer.** Absorbance wavelengths of ADA-07 were scanned using a Beckman DU®800 spectrophotometer.

**Supplementary Figure 4. The binding between ADA-07 and TOPK is illustrated by Maestro in the Schrödinger Suite.** The binding model shows that the hydrogen atom (white color) of glycine binds with oxygen (red color) and nitrogen (blue color) of ADA-07 to form hydrogen bonds. The oxygen atom of glycine binds with hydrogen of ADA-07 to form a hydrogen bond.

**Supplementary Figure 5. ADA-07 significantly suppresses SUV-induced skin carcinogenesis in SKH-1 hairless mice (early-stage prevention).** A, average body weight of SKH-1 hairless mice.Mice were weighed once a week until the end of the study at week 28. B, external appearance of tumors. SKH-1 hairless mice were treated as described in Materials and Methods. The mice in the control groups (n = 9) received no vehicle/no SUV (n = 3), vehicle/no SUV (n = 3), or 1 mg ADA-07/no SUV (n = 3), respectively. The mice in the SUV treated group received SUV only (n = 12) and the mice in the vehicle/SUV-treated group (n = 12) were treated with oil-in-water emulsion cream before SUV exposure. The mice in the 0.1 mg/SUV or 1 mg/SUV groups (n = 12 each) received treatment with ADA-07 (0.1 or 1 mg, respectively) before SUV exposure. The frequency of irradiation was set at 3 times a week for 15 weeks. The respective doses of oil-in-water emulsion cream or ADA-07 were applied topically to the dorsal area. Tumor incidence and multiplicity were recorded weekly until the end of the experiment at week 28.

**Supplementary Figure 6. ADA-07 significantly suppresses SUV-induced skin carcinogenesis in SKH-1 hairless mice (late-stage prevention).** A, average body weight of SKH-1 hairless mice.Mice were weighed once a week until week 28. B, external appearance of tumors. SKH-1 hairless mice were treated as described in Materials and Methods. The mice in the control groups (n = 9) received no vehicle/no SUV (n = 3), vehicle/no SUV (n = 3), or 1 mg ADA-07/no SUV (n = 3), respectively. The mice in the rest of the groups received SUV irradiation for 15 weeks 3 times a week. The mice in the vehicle/SUV-treated group (n = 12) were treated with oil-in-water emulsion cream 3 times a week until the end of the experiment (28 weeks). The mice in the 0.1 mg/SUV or 1 mg/SUV groups (n = 12 each) received treatment with ADA-07 (0.1 or 1 mg, respectively) 3 times a week until the end of the experiment (28 weeks). The respective doses of oil-in-water emulsion cream or ADA-07 were applied topically to the dorsal area. Tumor incidence and multiplicity were recorded weekly until the end of the experiment at week 28.