

Electronic Supplementary Information

Experimental

Materials. Mesogenic compounds **I-CN**, **I-OMe**, and **I-F** were prepared using a reported method.¹⁵ Purification of the final product was conducted with column chromatography over silica gel (63–210 μm ; Kanto Chemical Co. Inc.) using a dichloromethane: ethyl acetate (20:1) mixture as the eluent, followed by recrystallization from ethanol. The structures of the compounds were confirmed using infrared (IR) spectroscopy (FTS-30; Bio-Rad Laboratories Inc.) and proton nuclear magnetic resonance (^1H NMR) spectroscopy (JNM-ECA500; JEOL).

Antibodies. Anti-Cyclin Dependent Kinase 2 (CDK2) and Anti-Actin antibodies (Goat, C-11, sc-1615) were purchased from Santa Cruz Biotechnology (Santa Cruz, California, USA). The anti-stress activated protein kinase/c-Jun-N-terminal kinase (SAPK/JNK) antibody (Rabbit, #9258), anti-p44/42 (extracellular signal-regulated kinase, ERK) kinase antibody (Rabbit, #9102), anti-phospho-SAPK/JNK antibody (Rabbit, #9251), and anti-phospho-ERK antibody (Rabbit, #9101) were purchased from Cell Signaling Technology (Tokyo, Japan).

Cell line. The A549 human lung cancer cell line and WI-38 fibroblast cells were purchased from the RIKEN Bio-Resource Center (Tsukuba, Japan). These cells were maintained in continuous culture in Dulbecco's MEM medium (DMEM, Sigma Chemical Co., St. Louis, USA) supplemented with 10% heat-inactivated fetal bovine serum (Bioserum; UBC, Japan) in a humidified atmosphere at 37 °C and 5% CO₂.

Cell growth inhibition assay. Each cell line was seeded in a 24-well tissue culture plate (Falcon; Becton Dickinson Biosciences, Franklin Lakes, USA) with 1 ml of culture medium at a concentration of 4×10^3 cells/well. After 24 hr incubation, cells were fed again with fresh medium supplemented with each material. After culturing for 4 (A549 cells) or 7 (WI-38 cells) days, the cells were harvested with 0.1% trypsin-EDTA (Gibco® Invitrogen, California, USA) and total cell numbers were analyzed using a particle counter (Z-Series; Coulter Electronics, Hialeah, Franklin

Lakes, USA). The relative value normalized to the control values was calculated as the ratio of the number of LC material-treated cells to the number of control cells.

Cell cycle analysis by flow cytometry. A549 cells were treated with each of the LCs using a tissue culture dish (Iwaki Glass Co. Ltd., Chiba, Japan) according to the method described above. After 24 hr treatment, harvested cells were treated with PBS containing 0.1% Triton X-100 (Wako Pure Chemical Industries Ltd., Osaka, Japan) and stained with propidium iodide (25 μ g/ml, Sigma Chemical Co.). An analysis of the cell cycle distribution was performed using a flow cytometer (Epics XL; Beckman-Coulter Inc., Fullerton, California, USA).

SDS-PAGE and Western blotting. SDS-PAGE and Western blot were performed as described in previous reports [1,2]. Briefly, A549 cells were treated with each compounds in the medium and incubated for 12–48 hr. The harvested cells were lysed with 50 mM Hepes-HCl (pH 7.4), 100 mM NaCl, 1% TritonX-100, and 1 mM PMSF (Wako) on ice for 30 min and sonicated twice for 30 s at 4 °C. After centrifugation at 12,000 rpm for 45 min at 4 °C, the protein concentration in the supernatant was determined with a Bio-Rad Protein Assay Kit (Bio-Rad Lab, Hercules, California, USA). An equal volume of sample buffer (625 mM Tris-HCl, pH 6.8, 20% SDS, 2% 2-mercaptoethanol, 2% glycerol) was added to supernatant, which was then boiled for 5 min. Proteins (30–50 μ g) were separated using SDS-PAGE and transferred onto nitrocellulose membranes (ADVANTEC Toyo, Tokyo, Japan). The membrane was reacted with each primary antibody in Tris-buffered saline (10 mM Tris-HCl, pH 7.4, 100 mM NaCl, 0.1% Tween-20) supplemented with 5% non-fatty milk or BSA for 1 h at room temperature after blocking of the membrane. After exposure to the primary antibody, these membranes were labeled with donkey anti-rabbit IgG-HRP or anti-goat IgG-HRP antibody (Santa Cruz) and each antigen was detected using Pierce ECL Western Blotting Substrate (Pierce Biotechnology Inc., Rockford, USA).

Statistical analysis. The significance of the differences between the control and experimental groups were determined using Student's *t*-test. Statistically significant differences were inferred for *p*-values of less than 0.05.

Characterization of LC Properties. The initial phase assignments and corresponding transition temperatures for the final product were determined using polarized optical microscopy (POM) with a polarizing microscope (Optiphot-pol; Nikon Corp.) equipped with a hot stage and an FP80 control processor (FP82; Mettler Inst. Corp.). The heating and cooling rates were 5 °C min⁻¹. Photomicrographs were taken using a camera (C-5050 ZOOM; Olympus Optical Co. Ltd.) with an attached polarizing microscope (Optiphot-pol; Nikon Corp.). Temperatures and enthalpies of transition were investigated using differential scanning calorimetry (DSC) with a calorimeter (DSC6200; Seiko Instruments Inc.). A sample preparation for the investigation of lyotropic liquid-crystalline behavior was as follows. Each material was dissolved in dimethyl sulfoxide (DMSO) at a concentration of 10 mM. The DMSO solution was added to various amounts of water. Turbidity of a sample was observed using a double-beam spectrometer (U-2810; Hitachi High-Technologies Co.). Absorbance at 500 nm of each sample is shown against the concentration. The critical aggregated concentration is defined as the threshold concentration.

Ref [1] J. S. Hosseinimehr, O. Inanami, T. Hamasu, M. Takahashi, I. Kashiwakura, T. Asanuma and M. Kuwabara, *J. Radiat. Res.*, 2004, **45**, 557-561.

Ref [2] Y. Liu, T. Nakahara, J. Miyakoshi, D. L. Hu, A. Nakane and Y. Abe, *J. Radiat. Res.*, 2007, **48**, 13-20.