Electronic Supplementary Information

Experimental

Materials. Mesogenic compounds I-CN, I-OMe, and I-F were prepared using a reported method. 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 x 103 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 μg/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 Hapes-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-mercaptpethanol, 2% glycerol) was added to supernatant, which was then boiled for 5 min. Proteins (30–50 μg) 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.