Supplementary Supporting Information

Direct Evidence on the External Stimuli Induced Dissembly of DNA through Microscopic Techniques

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Experimental details and Figures S1-S6 showing AFM images, circular dichroism spectra and thermal denaturation curves of calf thymus DNA under different conditions.

Experimental Section

General Techniques. The electronic absorption spectra were recorded on a Shimadzu UV-VIS-NIR spectrophotometer. Circular dichroism (CD) spectra were recorded on Jasco Corporation, J-810 spectropolarimeter. Doubly distilled water was used in all the studies. All experiments were carried out at room temperature (25 ± 1 $^{\circ}$C), unless otherwise mentioned. The compounds reported in this manuscript have been prepared as per reported procedures.

Atomic Force Microscopy (AFM). Atomic force microscopic images were captured using air-dried sample. Samples for the imaging were prepared by drop casting the DNA solution in the absence and presence of ligands on freshly cleaved mica at the required concentrations. Samples were allowed for air-drying under ambient conditions. Subsequently, the samples were gently rinsed with a jet of de-ionized water which removes the salt from the sample surface. Similar methods were adopted to prepare samples for other imaging techniques.[1] AFM images were recorded under ambient conditions using a Digital Instrument Multimode Nanoscope IV operating in the tapping mode regime. Micro-fabricated silicon cantilever tips (MPP-11100-10) with a resonance frequency of 299 kHz and a spring constant of 20-80 Nm^{-1} were used. The scan rate varied from 0.5 to 1.5 Hz. AFM section analysis was done offline.

Optical Polarizing Microscopy (OPM). Sample solution in the absence and presence of ligands was drop casted in a glass cover slip and allowed for air-drying under ambient conditions. OPM images were obtained using Nikon HFX 35A Optiphot-2

polarized light optical microscope. All the OPM images are recorded under 40x magnifications.

Scanning Electron Microscopy (SEM). Sample solution in the absence and presence of ligands was placed on sample studs and coated with gold by ion sputtering. SEM images were obtained on a JEOL 5600 LV scanning electron microscope with an accelerating voltage of 15 kV.

REFERENCES

(1) Brett, A. M. O.; Chiorcea, A. M. Atomic Force Microscopy of DNA Immobilized onto a Highly Oriented Pyrolytic Graphite Electrode Surface. *Langmuir* **2003**, *19*, 3830-3839.

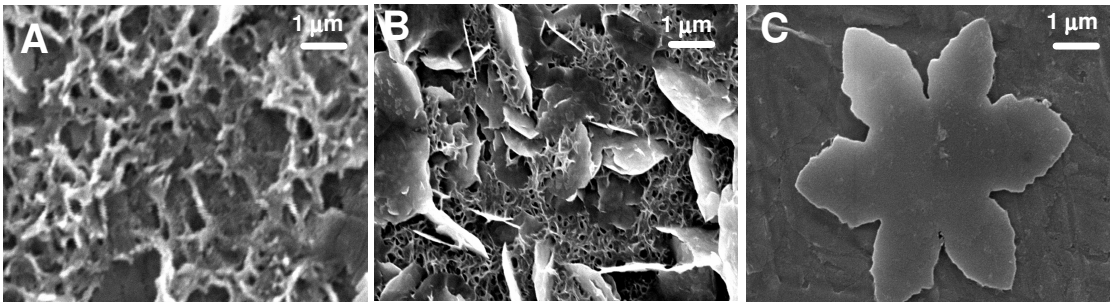

Figure S1. SEM images of DNA at different concentrations. [DNA] (A) 30; (B) 40 and (C) 80 µM.

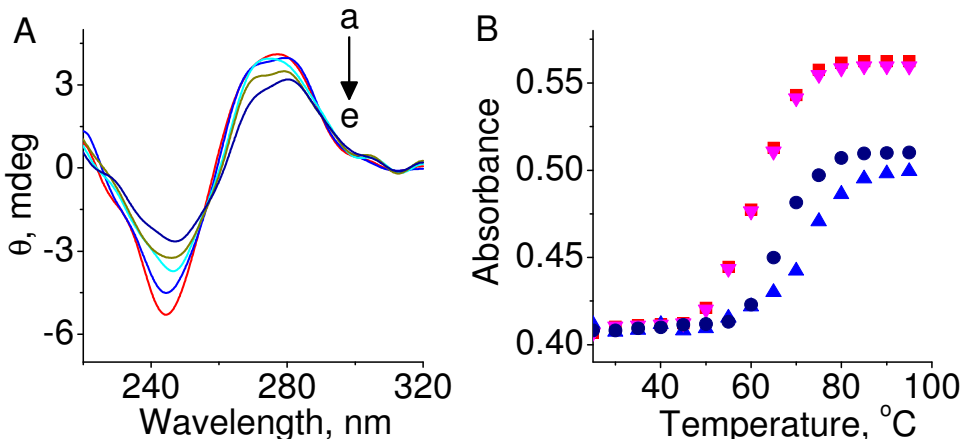

Figure S2. A) CD spectra of calf thymus DNA (62 μM) with increase in temperature (a) 25; (b) 40; (c) 55; (d) 70 and (e) 95 °C. B) Thermal denaturation curve of DNA (30 μM) (■) in phosphate buffer (1 mM) containing 1 mM NaCl; in presence of ligands (5 μM each) **1** (▲); **2** (●) and **3** (▼).

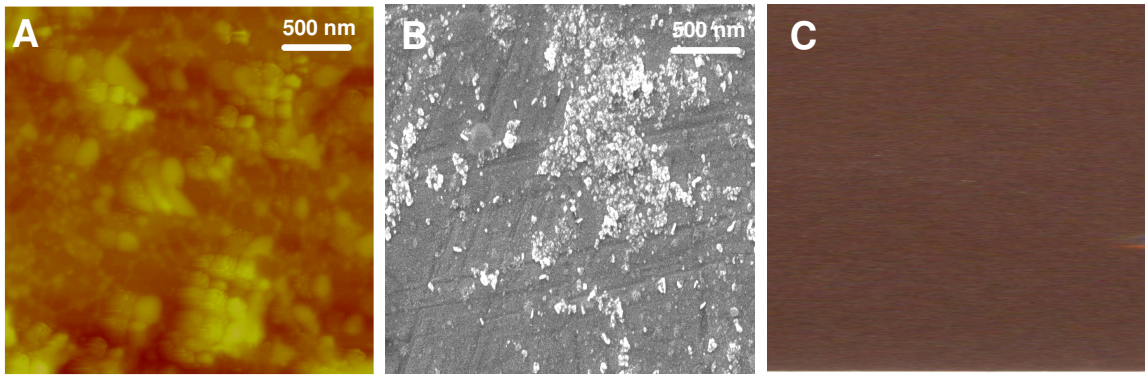

Figure S3. (A) AFM height (Scale x, y, 3.3 μm/div; z, 10 nm/div), (B) SEM and (C) OPM (40x) images of (1:1) complex formed between calf thymus DNA (20 μM) and the ligand **1** (20 μM).

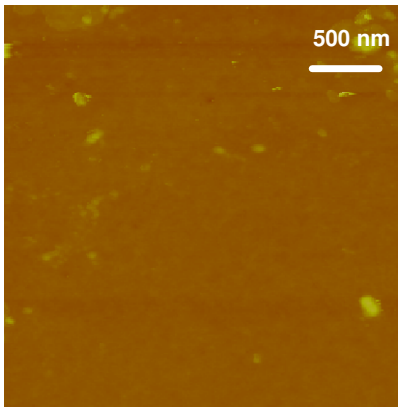

Figure S4. AFM height image of 1:1 complex between calf thymus DNA (20 μM) and the ligand **2** (20 μM) (Scale x, y, 3.3 μm/div; z, 10 nm/div).

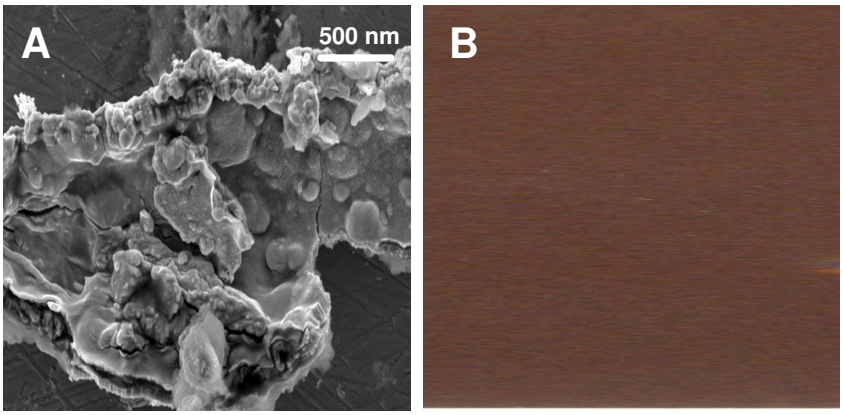

Figure S5. Images obtained through (A) SEM and (B) OPM (40x) techniques after denaturing DNA (20 μM) at 90 ^{o}C for 5 min followed by sudden cooling to 25 ^{o}C.

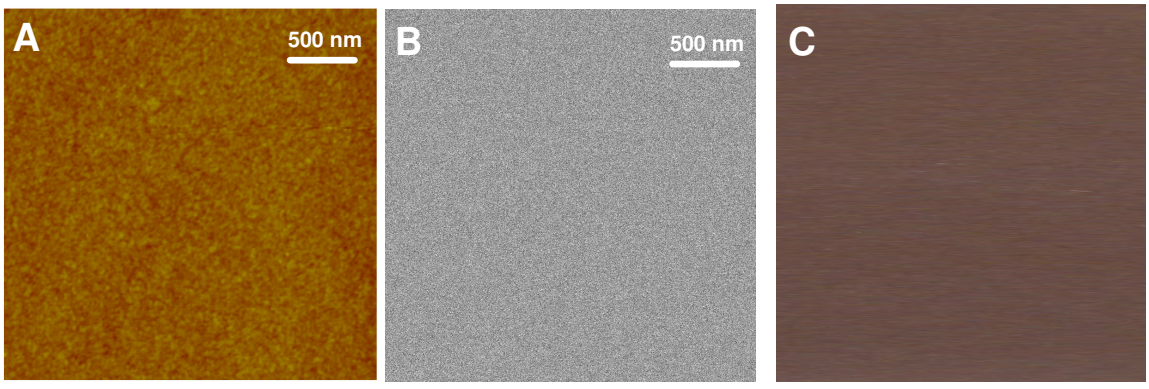

Figure S6. Images of bovine serum albumin (BSA, 20 μM) using (A) AFM (Scale x, y, 3.3 μm/div; z, 10 nm/div); (B) SEM and (C) OPM (40x) techniques.